Financial hedging and firm performance: evidence from cross-border mergers and acquisitions

Article

Accepted Version

Financial Hedging and Firm Performance: Evidence from Cross-Border Mergers and Acquisitions*

Zhong Chen[1], Bo Han[2], and Yeqin Zeng †[1]

[1]University of Reading
[2]Central Washington University

June 10, 2016

Abstract

This paper studies the impact of financial hedging on firm performance in cross-border mergers and acquisitions (M&As). Using a sample of 1,369 acquisitions announced by S&P 1500 firms between 2000 and 2014, we find strong evidence that derivatives users experience higher announcement returns than nonusers, which translates into a $193.7 million shareholder gain for an average-sized acquirer. In addition, we find that acquirers with hedging programs have higher deal completion probabilities, longer deal completion time, and better long-term post-deal performance. We confirm our findings after employing an extensive array of models to address the potential endogeneity. Overall, our results provide new insights into a link between corporate financial hedging and firm performance.

Keywords: Cross-border M&As; Risk Management; Financial Derivatives
JEL classification: F31; G13; G32; G34

*We would like to thank the two anonymous referees, the journal editor John Doukas, Eric de Bodt, Chris Brooks, Tao Chen, Zhiyao Chen, Michael Clements, Pasquale Della Corte, Espen Eckbo, Zhan Feng, Ranko Jelic, Wei-Ming Lee, Lalitha Naveen, Annette Poulsen, Karin Thorburn, Baolian Wang, Ke Yang; and seminar participants at ICMA Centre of Henley Business School, Central Washington University, 2nd Young Finance Scholars' Conference at University of Sussex, IFABS 2015 Corporate Finance Conference at Oxford University, 15th Finance, Risk and Accounting Perspectives Conference, 2015 Financial Management Association Annual Conference, 2015 Paris Financial Management Conference, the fourth ECCCS Workshop on Governance and Control, and BAFA Annual Conference 2016 for their insightful and constructive comments. We thank Anh To and Norika Kobayashi for their research assistance. The financial support from ICMA Centre is gratefully acknowledged.

†Corresponding author: Yeqin Zeng. Email: y.zeng@icmacentre.ac.uk. Phone: +44(0)1183784378. ICMA Centre, Henley Business School, University of Reading, Reading, Berkshire RG6 6BA, U.K. Zhong Chen, zhong.chen@icmacentre.ac.uk, +44(0)7427621291, ICMA Centre, Henley Business School, University of Reading, Reading, Berkshire RG6 6BA, U.K. Bo Han, HanB@cwu.edu, +15099633846, College of Business, Central Washington University, Des Moines, WA 98198, U.S.

1 Introduction

Financial derivatives have been widely used as risk management instruments by companies around the world.[1] Despite the popularity of using financial derivatives among corporations and the theoretical groundwork in support of corporate financial hedging (e.g., Mayers and Smith, 1982; Stulz, 1984; Smith and Stulz, 1985; Leland, 1998; Froot et al., 1993; DeMarzo and Duffie, 1995), empirical findings on the relation between corporate financial hedging and firm value are still mixed. For example, Allayannis et al. (2001) find that the use of foreign currency derivatives is positively correlated with firm value in a large sample of U.S. nonfinancial corporations with foreign currency risk exposures. Carter et al. (2006) report a significantly positive hedging premium among a sample of U.S. airline firms that engage in jet fuel hedging. However, Guay and Kothari (2003) show that the cash flows generated by hedging are modest and cannot account for a large increase in firm value. Jin and Jorion (2006) study a sample of oil and gas producers and find no significant impact of financial hedging on firm value.

In addition to the mixed findings on the relation between hedging and firm value, empirical studies that examine the effect of hedging on firm operating activities have been surprisingly lacking. In this paper, we fill this gap by studying an important form of firm operation that is well known for changing a company's financial risk exposure – cross-border mergers and acquisitions. By examining the impact of hedging on deal performance, we seek to contribute to the literature on whether, and how, risk management affects firm performance. Cross-border M&A activities have been on the rise around the world over the last two decades as a result of deregulation and the globalization of product and capital markets.[2] Compared to domestic M&As, cross-border M&As involve additional

[1] A 1998 Wharton survey of financial risk management by U.S. non-financial firms (Bodnar et al., 1998) finds that 41.5% of respondents use foreign currency derivatives and 38% firms use interest rate derivatives. An International Swaps Derivatives Association (ISDA) survey in 2009 shows that 94% of the world's 500 largest companies use derivatives to manage their business and financial risks, of which 88% use derivatives to manage foreign currency risk. According to the statistics released by the Bank for International Settlements (BIS), the notional value of outstanding interest rate and foreign currency derivatives held by global non-financial customers was $15.7 trillion and $9.1 trillion, respectively, at the end of June 2014.

[2] Thomson Reuters reports that global cross-border M&As reached a peak level of $1.8 trillion in 2007, accounting for 44.8% of overall M&A volume. After the global financial crisis, the value of global cross-border M&As hit bottom

risk elements due to differences in culture, geography, capital market development, accounting rules, and regulations between the acquirer and the target countries. More importantly, taking over a foreign target significantly changes the acquirer's financial risk exposures. As shown in Figure 1, the timeline of M&A transactions can be divided into three stages: pre-acquisition period (between the start of private negotiation and the deal announcement), interim period (between the deal announcement and completion), and post-acquisition period (after deal completion).[3] An acquirer in a cross-border M&A encounters deal related risk exposures at different stages. During the pre-acquisition stage, both the acquirer and the target encounter valuation fluctuation due to exchange rate movements, which may change the target's attractiveness to the acquirer. During the interim stage, an acquirer is exposed to new foreign exchange (FX) risk if the payment is denominated in the target nation's currency. In addition, if an acquisition requires external financing, the acquirer is exposed to interest rate (IR) risk, which affects the deal financing costs. During the post-acquisition stage, an acquirer faces greater FX exposures as a result of acquiring the foreign target and increased foreign operation.

There are four main advantages in studying the impact of hedging on firm performance through cross-border M&As. First, this sample naturally excludes firms without FX exposure. A firm that does not have significant financial risk exposure may choose not to hedge due to the lack of hedging benefits. If a sample includes firms of this nature, then the empirical tests to examine the impact of hedging on firm performance may be compromised because these firms do not serve as an effective control group. By focusing on firms experiencing significant increase in their risk exposures, we are able to conduct more effective tests to identify the potential hedging benefits. Second, this sample allows us to adopt the standard M&A event study approach, which mitigates the reverse causality concern that firms with better performance are more likely to hedge rather than hedging leading to improved deal outcomes. By examining acquirers' established derivatives contracts before

in 2009 and then gradually recovered to $1.3 trillion in 2014, accounting for 36.9% of overall M&A volume.

[3]We follow Ahern and Sosyura (2014) to define these three time periods.

their deal announcements when firm performance is measured, this approach alleviates the reverse causality concern because it is unlikely that the M&A announcement returns are responsible for the establishment of hedging programs in acquiring firms. Third, the event study approach allows us to examine the impact of hedging on firm performance measured by stock market reaction and firm operating performance, which offer an alternative to the firm value measure, Tobin's Q, adopted by most risk management studies. Acquirer announcement returns directly measure the acquirer shareholder wealth effect associated with hedging. Finally, being the first to directly study the effect of financial risk management on a specific type of firm operation, our results can shed some light on the channels through which financial hedging improves firm value.

Our sample includes 1,369 cross-border M&A deals announced by S&P 1500 firms between 2000 and 2014.[4] The S&P 1500 index covers 90% of the U.S. stock market capitalization and includes firms of various sizes (S&P 500 Large Cap, S&P 400 Mid Cap, and S&P 600 Small Cap) and industries. For each deal, we hand collect the acquirer's derivatives data reported in its 10-K report prior to the corresponding deal announcement date, following the derivatives data collection procedure in Allayannis and Weston (2001) and Bartram et al. (2011).[5]

Our sample firms make foreign acquisitions in over 35 countries. More than 72% of these acquirers use either foreign currency derivatives (FCD) or interest rate derivatives (IRD) to manage firm financial risks. About 63% of acquirers use FCD and more than 37% of acquirers have FCD positions in the currencies of target nations. Our univariate tests show that derivatives users are better than nonusers along the dimensions of both short-term and long-term performance. We also find that derivatives users and nonusers differ significantly in terms of size, leverage, cash ratio,

[4]Empirical research on corporate financial hedging after 2000 is scant due to the change in accounting rules on derivatives information disclosure in firms' annual financial reports. Please refer to the internet Appendix A for a further discussion on the changes in these accounting rules.

[5]In the internet Appendix B, we present a few excerpts from acquirers' 10-K reports. These statements provide direct evidence that acquirers use derivatives to actively manage the financial risks associated with their cross-border M&As. Under current financial accounting reporting standards, it is not mandatory for U.S. public firms to disclose their hedging position details. Therefore our hedging proxy variables can only represent firm level financial hedging, not deal specific hedging. There is a portion of firms in our sample that disclose M&A deal-specific hedging activities in their 10-K reports.

stock return momentum and volatility, as well as return on assets (ROA). In addition, the use of derivatives is more prevalent in acquirers that take over large targets and use less equity as the method of payment. These differences emphasize the importance of multivariate tests.

Our multivariate tests confirm that financial hedging is positively associated with acquirer cumulative abnormal returns (CARs) during the announcement period. Hedging with currency derivatives is associated with an average 1.0% improvement in acquirer CARs which is equivalent to an increase of $193.7 million in shareholder value for an average-sized acquirer. We also find that financial hedging has an effect on other aspects of deal outcomes. First, deals made by firms with financial hedging programs have a higher completion probability than deals by firms without such programs. Next, we show that it takes FX derivatives users an average of 32 days longer to complete a deal than nonusers. Our observation is consistent with the interpretation that waiting costs for derivatives users are lower than for nonusers during the deal negotiation phase.[6] We also investigate whether the short-run superior performance of derivatives users extends into the long-run. In terms of operating performance, we find that the change in abnormal return on assets (AROA) for FCD users is on average 0.7% higher than nonusers over a three-year time period after M&A deals. The improved long-term performance related to hedging is also confirmed by measures of stock returns. Over a three-year horizon, FCD users experience 0.4% higher buy-and-hold abnormal stock returns (BHAR) than nonusers. Overall, we find strong evidence that financial hedging is related to improved deal performance for acquirers engaged in cross-border M&As.

A major concern for the interpretation of our empirical results is that the decision to establish a financial hedging program is not made randomly. It may depend on omitted firm characteristics variables which could independently affect M&A outcomes. To address this concern, we employ three different methods. First, we adopt a special form of Heckman selection model (Heckman, 1978): an endogenous treatment effect model with two-step consistent estimates (Wooldridge,

[6] Offenberg and Pirinsky (2015) suggest that a deal's completion time is determined by the trade-off between the costs and benefits of waiting.

2010). This approach helps us estimate the "treatment effect" – that the superior deal performance of derivatives users over nonusers is caused by hedging instead of other unobserved variables. We adopt two instrument variables from Geczy et al. (1997), who find that the number of analysts following a firm and the foreign sales over total sales ratio can explain why firms use foreign currency derivatives. Second, we follow Gormley and Matsa (2014) and estimate a triple interaction fixed effects model, i.e., Year × Acquirer Industry × Target Industry, to control for unobserved heterogeneity. Finally, we conduct a propensity score matching (PSM) analysis. For each acquisition announced by a derivatives user in our sample, we pair it with a group of similar deals announced by nonusers using observed deal and firm characteristics. Then we compare the deal performance between these two samples. Our findings on the relation between financial hedging and deal performance remain robust in these three tests.

To further check on the alternative explanations for our empirical results, we conduct a battery of robustness tests. First, since acquiring firms with high quality management teams, extensive foreign operating exposure, and rich acquisition experience are more likely to use financial derivatives and have better announcement returns, we verify that the positive effect of financial hedging on acquirer announcement returns remains robust after including all these additional control variables. Second, we add commodity derivatives (CD) as a control variable in our tests, because CD are related to firm characteristics that determine a firm's risk management policy but are not directly related to the financial risks associated with cross-border M&A deals. We find that FCD and IRD variables remain significantly positively related to acquirer announcement returns but CD variable is not. This finding is inconsistent with the notion that derivatives hedging only signals unobserved acquirer characteristics. Finally, by dividing our sample periods into a high exchange rate volatility regime and a low volatility regime, we show that the positive effect of FX hedging on acquirer announcement returns is more significant when exchange rate volatility is high, suggesting that derivatives are more beneficial to acquirers under volatile market condition. Related to this,

we confirm that the implied volatilities of at-the-money (ATM) options written on acquirer stocks at the deal announcement are lower for derivatives users than nonusers.

The paper proceeds as follows. Section 2 reviews the related literature on risk management and cross-border M&As. Section 3 develops the main test hypotheses and predictions. Section 4 describes the sample, variable definitions, and summary statistics. Section 5 reports our main empirical results while section 6 presents robustness checks and additional discussions. Finally, section 7 concludes.

2 Related literature

2.1 Financial hedging and firm value

Within the classic framework of Modigliani and Miller (1958), risk management has no impact on firm value and hedging is irrelevant if investors can engage in "home-made" hedging. However, corporate risk management becomes valuable due to the existence of market imperfections in practice. Several motivations of corporate financial hedging have been developed in previous literature, including reduction in financial distress costs (Mayers and Smith, 1982; Stulz, 1984; Smith and Stulz, 1985), alleviation of information asymmetry (DeMarzo and Duffie, 1995), mitigation of agency costs associated with underinvestment and risk-shifting (Stulz, 1984; Froot et al., 1993; Leland, 1998), reduction in cost of debt (Chen and King, 2014), reduction in cost of equity (Gay et al., 2011), and alleviation of effective tax payments (Graham and Rogers, 2002). Survey results also suggest that academics commonly support the view that corporate financial hedging in general helps firms manage risks efficiently and increases shareholder value.[7]

[7]In March 2004, ISDA conducted a survey of finance professors at the top 50 business schools worldwide to solicit their opinions on corporate financial hedging, as well as on the impact of derivatives on the global financial system. A total of 84 professors from 42 institutions provided responses. When asked to rate the statement "Managing financial risk more effectively is a way for companies to build shareholder value," 44% strongly agreed, 47% agreed, 7% somewhat agreed, and only 2% somewhat disagreed. When asked whether "Derivatives help companies manage financial risk more efficiently," 49% strongly agreed, 43% agreed, 8% somewhat agreed, and no participant disagreed with the statement.

Despite the theoretical groudwork, empirical evidence on the relation between financial hedging and firm value remains mixed. Geczy et al. (1997) examine a sample of U.S. non-financial firms and find that hedging reduces firms' cash flow fluctuations. Allayannis et al. (2001) identify a hedging premium of about 5% of firm value for a sample of U.S. non-financial firms. Carter et al. (2006) report a higher hedging premium of 10% based on a sample of firms in the airline industry. Using international data, Bartram et al. (2011) find strong evidence that hedging firms have significantly lower cash flow volatilities, total risk, and systematic risk. On the other hand, Tufano (1996) studies the hedging policy of a sample of gold mining companies but fails to find a significant relation between risk management and firm value. Guay and Kothari (2003) conclude that corporate derivatives positions in general are far too small to account for the valuation premium observed by Allayannis et al. (2001). Jin and Jorion (2006) conclude that financial hedging has no significant effect on the market value of a sample of U.S. oil and gas producers. Similarly, Brown et al. (2006) confirm that selective hedging does not lead to better operating or stock performance among a sample of U.S. gold mining firms. One potential explanation for these mixed empirical findings is the self-selection bias. The FX exposures of U.S. corporations are determined by their foreign operations (Allayannis and Ihrig, 2001) and companies with variable risk exposures receive different hedging benefits in terms of value improvement (Pritamani et al., 2004).

A recent strand of literature studies the potential channels through which firms benefit from financial hedging. Campello et al. (2011) find that derivatives users receive more favorable financing terms in their loan agreements than nonusers. Graham and Rogers (2002) report that hedging helps increase debt capacity, leading to an average 1.1% increase in firm value. Relatedly, Chen and King (2014) confirm that the bond yield spread for derivatives users is lower than for nonusers. Gay et al. (2011) report that firms using derivatives have a lower cost of equity than nonusers. Pérez-González and Yun (2013) use the innovation of weather derivatives as a natural experiment and find that the introduction of such derivatives leads to higher leverage, more investment, and ultimately higher

firm value for a sample of electric and gas utility firms with weather risk exposures.

2.2 Financial hedging and M&As

M&As not only have a huge impact on an acquirer's future operation and growth, but also significantly change its risk profile. For example, Furfine and Rosen (2011) find that M&As increase the average default risk of the acquiring firms. Duchin and Schmidt (2013) report that acquisitions completed during U.S. merger waves have higher uncertainty and information asymmetry than those occurring out of merger waves, leading to poorer deal outcomes. Bhagwat et al. (2016) suggest that M&A activities decrease when stock market volatility increases, because the higher interim period risk makes deals less attractive to both potential acquirers and targets. Bhagwat and Dam (2014) provide evidence that acquirers bear more interim period risk than targets.

Cross-border M&As have received increased attention in recent studies because acquirers in these deals experience significant FX risk change. Moeller and Schlingemann (2005) confirm that cross-border M&As increase acquirers' foreign currency exposures. They also report that cross-border acquirers have poorer stock and operating performance than acquirers in domestic deals. To study how firms respond to exchange rate shocks in making investment decisions, Lin et al. (2014) examine around 1,000 cross-border M&As and find that acquirers in countries experiencing large currency appreciation have higher abnormal announcement returns. They further conclude that this wealth effect is more significant for acquirers with strong corporate governance. Bartram et al. (2013) examine a sample of U.S. firms acquiring foreign targets and conclude that these acquisitions reduce the acquirers' currency risk exposures if they have prior presence in the target's countries. Lin et al. (2009) conclude that because financial derivatives users suffer less information asymmetry than nonusers, they tend to have better long-run stock performance than nonusers after cross-border M&As.

Despite the wide range of studies on market uncertainties and M&As, empirical research is

still scarce on whether acquirers use financial derivatives to manage their deal related risk and, if they do, how successful they are in this effort. Our paper is among the first to shed light in this area.

3 Hypotheses and empirical predictions

In this paper, we examine different deal outcomes between financial derivatives users and nonusers in cross-border M&As. Employing the standard M&A event study approach, we develop and test four hypotheses.

- ***Hypothesis (H1):*** *Acquirer CARs around cross-border M&A announcements are higher for financial derivatives users than nonusers.*

Financial hedging is beneficial for an acquirer over the timeline of a cross-border M&A transaction. During the pre-acquisition period, an acquirer with existing risk management programs has better ability and lower costs in evaluating the financial risks associated with the potential deal. At the deal announcement, financial hedging sends investors a positive signal of an acquirer's financial risk management expertise and mitigates the information asymmetry problem between firm manager and outside investors (DeMarzo and Duffie, 1995). During the interim period, regardless of the payment method, financial hedging reduces the acquirer FX risk exposures associated with deal payments. If an acquirer needs external financing, then IR derivatives help it manage the IR risk exposure. Financial hedging is also directly associated with lower external financial costs (e.g., Campello et al., 2011; Chen and King, 2014). After the deal completion, an acquirer with hedging experience can design more effective risk management strategies for the combined entity in the integration process. During the post-acquisition period, an acquirer's balance-sheet FX risk will increase, because the acquired assets and liabilities are denominated in foreign currencies. The FX risk exposures of an acquirer's future operating cash flows will also increase after acquiring the

foreign target. An acquirer who uses derivatives can manage both balance-sheet and operating cash flow FX risks more efficiently than an acquire who doesn't, leading to superior market reaction at the deal announcement.

The benefits of financial hedging associated with acquirer announcement returns can be categorized in the following way. First, financial hedging can effectively reduce both total and systematic risk of a company (Bartram et al., 2011). Acquiring a foreign target greatly changes a company's financial risk exposure, and both FX and IR derivatives reduce deal related financial risk. Second, hedging experience helps an acquirer evaluate the financial risk associated with the M&A deal, which can help it choose a better target. An acquirer with hedging capacity may also be in a better negotiation position so that it can get better deal terms. Third, financial hedging sends outside investors a positive signal about a firm's international operation experience and managerial ability, which can help investors assess deal quality more precisely and reduce information asymmetry. Fourth, financial hedging reduces deal transaction costs. Firms with financial hedging are found to experience lower external financing costs (e.g., Campello et al., 2011; Chen and King, 2014). Finally, because of the relative consistency of a firm's hedging policy, an acquirer that hedges its financial risk exposures before the deal announcement is expected to continue to manage its financial risk exposures after deal completion. The expectation of future risk reduction of the combined firm will generate a positive stock market reaction at the deal announcement.[8]

- ***Hypothesis (H2):*** *Cross-border M&As carried out by derivatives users have a higher probability of completion than those carried out by nonusers.*

The probability of deal completion will increase with an acquirer's hedging experience for four reasons. First, because it is costly to establish hedging programs and the hedging positions will

[8] We acknowledge that in some cases, an acquirer purchases a foreign target as an operational hedge for its existing FX risk exposure. This will reduce the benefits of financial hedging and alleviate the positive effect of hedging on acquirer announcement returns.

result in a contractual commitment to carry out the deal, a pre-established foreign exchange hedging position in the target nation's currency signals the acquirer's commitment to the deal. Second, an established financial hedging program can help an acquirer manage deal related financial risk and reduce the transaction risk exposures. It is less likely for an acquirer with a hedging program to withdraw a deal due to unexpected and unfavorable market conditions in the exchange rate or the interest rate. Third, hedging mitigates information asymmetry between investors and managers, which in turn reduces an acquirer's stock return volatility. For deals involving stock payments, target shareholders are thus more willing to accept acquirer stocks. Finally, financial hedging can lower an acquirer's external financing costs, so that a derivatives user can offer more competitive deal terms to the target.

- ***Hypothesis (H3):*** *Financial derivatives users experience longer deal completion time on cross-border M&As than nonusers.*

Offenberg and Pirinsky (2015) argue that M&A deal completion time is the result of a trade-off between the costs and benefits of waiting. The use of FCD and IRD can reduce an acquirer's financial risk exposure during the interim period, leading to lower waiting costs. Derivatives users can thus afford to take longer time to review the transaction details and negotiate more favorable deal terms than nonusers. In other words, because of the reduced FX risk and IR risk in the interim period, an acquirer with financial hedging programs has less pressure to rush through the deal and can take more time to appraise the deal terms. Additionally, established hedging programs demonstrate conservative risk attitude of a acquirer, who is inclined to take more time to carefully assess the transaction details and potential deal risks.

- ***Hypothesis (H4):*** *Financial derivatives users have better post deal long-run performance than nonusers after cross-border M&As.*

An acquirer attains increased foreign operations after the cross-border deal completion. This

changes the acquirer's FX risk exposures in the long term. As a result, the benefits of hedging may extend well beyond the deal announcement. Derivatives users may have better long-run performance than nonusers for the following three reasons. First, related to Hypothesis 3, the more deliberate deal consideration by derivatives users can lead to higher quality targets and more favorable deal terms. Second, certain types of derivatives put in place before the deal announcement, such as swaps, can continue to reduce the combined firm's risk exposure after deal completion. Finally, an acquirer who manages its risk exposures before the deal announcement is expected to continue to manage its exposure post-deal.

4 Data

4.1 Sample selection and variable construction

The data used in this paper are from several sources. We start with all cross-border M&As with announcement dates between 2000 and 2014 from the Thomson Reuters Securities Data Company (SDC) Platinum Mergers and Acquisitions database.[9] We require the acquirer to be publicly traded in the U.S. and the target to be a foreign company. Applying the standard filters used in the literature, we then exclude all transactions that are labeled as a minority stake purchase, acquisition of remaining interest, privatization, repurchase, exchange offer, self-tender, recapitalization, or spinoff. We further require a minimum deal value of $1 million and a minimum acquirer market value of $20 million. In line with previous M&A studies, the percentage of target shares held by the acquirer is restricted to be less than 10% prior to the transaction and more than 50% after the transaction. Following Allayannis and Weston (2001) and Bartram et al. (2011), deals with acquirers from the financial or utilities industry are dropped. This procedure yields an initial sample of $2,753$ observations. We further set the restriction that acquirers be included in the S&P

[9] Our sample period begins in 2000 because the U.S. Financial Accounting Standard Board (FASB)'s new standard for disclosure of derivatives transactions, Statement of Financial Accounting Standard No. 133 (SFAS 133, "Accounting for Derivative Instruments and Hedging Activities") became effective in June 1999. For detailed information, please refer to www.fasb.org/summary/stsum133.shtml.

1500 list when the deals were announced.[10] Finally, after merging with the Centre for Research in Securities Prices (CRSP) and Compustat, it leaves 1,385 cross-border M&A deals in our sample.

For each of the 1,385 M&As, we hand collect the acquirer's financial hedging data from the acquirer's 10-K or 10-K405 reports filed in the fiscal year prior to the deal announcement. All reports are retrieved from the Securities and Exchange Commission (SEC)'s EDGAR electronic filing system. We require that an acquirer have filed at least one 10-K or 10-K405 report when the deal was announced. Our final sample consists of 1,369 deals.[11]

We focus on the use of foreign currency derivatives and interest rate derivatives because they are directly related to the management of cross-border M&A risk exposures. Commodity derivatives information is also collected for our robustness tests. Following the corporate financial hedging literature,[12] we create the following hedging variables: 1) Fcd, a 0/1 binary variable indicating whether a firm hedges FX risk; 2) Fcd_target, a 0/1 binary variable indicating whether a firm hedges FX risk between the U.S. dollar and the target nation's currency; 3) Ird, a 0/1 binary variable indicating whether a firm hedges IR risk; 4) Fcd/Ird, a 0/1 binary variable which equals to 1 if a firm hedges either FX risk or IR risk, and 0 if the firm hedges neither of them; 5) Hedging_scope, a 0/1/2 categorical variable which equals 2 if a firm hedges both FX and IR risk, 1 if a firm hedges only one of these two risks, and 0 if a firm hedges neither of them; 6) Nv_derivatives, the aggregate notional value of FX and IR derivatives, normalized by the acquirers' total assets; and 7) Commodity, a 0/1 binary variable indicating whether a firm hedges commodity price risk.

[10] The S&P 1500, or S&P Composite 1500 index, is compiled by Standard & Poor's. The index combines all stocks in three leading indices: the S&P 500, the S&P MidCap 400, and the S&P SmallCap 600. It covers approximately 90% of the U.S. stock market capitalization. We restrict our sample to be within the S&P 1500 because certain control variables, such as corporate governance, are only available for these companies.

[11] Following the international finance and cross-border M&A literature, we delete observations in which the acquirer nations are Bermuda, Cayman Islands, Ecuador, and Netherlands Antilles.

[12] We search the following keywords in acquirer annual reports to locate the information of financial derivatives: "Item 7A," "derivative," "derivative(s) instrument(s)," "hedge," "financial instrument," "swap," "futures," "forward contract," "forward exchange," "option contract," "risk management," "foreign currency," "currency exchange," "notional," "fair value," "borrowing," "debt," "credit facilities," "line(s) of credit," "notes payable," "commodity," "commodities." This list of keywords is compiled based on those used in previous corporate financial hedging studies (e.g., Allayannis and Ofek, 2001; Allayannis and Weston, 2001; Graham and Rogers, 2002; Bartram et al., 2011; Campello et al., 2011). When a key word is found, we read the surrounding text and hand code our hedging variables.

We also collect the foreign currency denominated debt information and create a binary indicator variable, Foreign_debt, and use it as a control variable in our empirical analysis.[13]

We obtain firm accounting data from Compustat, foreign sales information from Compustat Segments Files, stock return and factor return data from the CRSP, financial analyst data from the Institutional Brokers Estimate System (IBES), and corporate governance information from the Institutional Shareholder Services (ISS, formerly RiskMetrics). Out of the 1,369 sample deals, we are able to collect geographical segment information for 1,323 of them. Following Allayannis and Weston (2001), we assume that for the remaining 46 deals, the acquirers have no foreign sales. In our robustness tests, we obtain the managerial ability scores (Demerjian et al., 2012) from Peter Demerjian's website and count the mentions of target nations in acquirers' 10-K reports. A detailed description of variables and data sources can be found in Appendix A.

4.2 Descriptive statistics

Figure 2 shows the distribution of our cross-border M&A sample by announcement year over the sample period 2000–2014. Consistent with Harford (2005), we find a merger wave pattern in our sample. The total number of deals drops twice following the burst of the Dot-com bubble in 2000 and the global financial crisis around 2008. The number of deals involving derivatives users and nonusers exhibits a very similar time-series pattern as the whole sample. Figure 2 also shows the S&P 1500 index annual return (multiply by 100) and the trade-weighted U.S. dollar index. The annual deal number exhibits a positive correlation with the S&P 1500 index return. This confirms the findings documented in previous studies that merger activities are positively correlated with the valuation of the stock market (e.g., Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf et al., 2005). It can also be observed that the trade-weighted U.S. dollar index exhibits high volatility during our sample period. The volatile exchange rate provides an incentive for acquirers to use derivatives to reduce cross-border deal related FX risk exposures.

[13] We supplement the foreign currency debt information using bond data from SDC's Global New Issues data set.

Panel A of Table 1 presents the distribution of our cross-border M&A sample by target nation/region. Our sample includes 1,369 deals with non-U.S. targets from a total of 58 different nations/regions. The top five target nations are the U.K. (294), Canada (219), Germany (134), France (89), and Australia (57). Panel B of Table 1 presents the industry distribution of acquirers in our sample according to the Fama–French 10 industry classifications (Fama and French, 1997). Business Equipment, Manufacturing, and Healthcare are the top three industries ranked by M&A deal number, accounting for a total of 74.6% of our sample observations. Other; Oil, Gas, and Coal; and Consumer Durables are the three industry groups with the smallest number of observations and together they account for 13% of total deals. Panel A and B demonstrate that our sample includes targets from a wide range of nations/regions and acquirers from diversified industries.

Panel C of Table 1 presents the summary statistics of our main hedging variables. Among the 1,369 M&As, 63.2% of acquirers use FCD, 43.2% of acquirers use IRD, and 72.6% acquirers hold at least one of these two types of derivatives. The proportion of derivatives users in our sample is higher than those reported in Bartram et al. (2011) (FCD 37.8% and IRD 40.4%) and Campello et al. (2011) (FCD 27.3% and IRD 35.6%). [14]

Since SFAS 133 became effective in 2000, it is no longer mandatory for U.S. public firms to report the notional value of their derivatives contracts as previously required in SFAS 119. However, among 994 acquirers with hedging programs in our sample, 820 still voluntarily report the notional value of their derivatives contracts. On average, the total notional value of FCD and IRD accounts for 12.9% of the total assets of these acquirers. It is also reported in Panel C that 19.9% of acquirers have outstanding foreign currency denominated debt and 19.8% of acquirers use commodity derivatives to hedge commodity price risks.[15]

[14] Allayannis and Weston (2001) find that the number of public firms using derivatives to manage financial risks increases over time. Our sample period is 2000–2014, which is later than the sample periods of Bartram et al. (2011) (2000–2001) and Campello et al. (2011) (1996–2002). In addition, previous hedging studies have shown a positive relation between firm size and the use of derivatives. Our sample firms are much larger than those in the previous studies because we focus on S&P 1500 firms capable of carrying out cross-border M&As, while Bartram et al. (2011) and Campello et al. (2011) do not have such sample restrictions.

[15] In a survey on 392 chief financial officers by Graham and Harvey (2001), 85.8% of the participants choose

Panel D of Table 1 reports the summary statistics of our key dependent variables of interest: acquirer announcement return (CAR_[-5, 5]), deal completion probability (Completion), number of days between M&A announcement and deal completion (Completion_time), acquirer long-run operating performance (△AROA_t,t+3), and acquirer long-run stock performance (BHAR_3Y). Summary statistics for the full, derivatives users, and nonusers samples are reported. On average, financial derivatives users have significantly better announcement returns, longer deal completion time, and better long-run performance than nonusers. The difference in deal completion probability between user and nonuser samples is not statistically significant.

Panel E of Table 1 presents the summary statistics of deal and acquirer characteristics. We report the number of observations, mean, and standard deviation of each variable for the full, derivatives user, and nonuser sample, respectively. The last column presents the statistical significance of mean difference tests between the derivatives user and nonuser samples. In total, we have 1,276 completed deals and 93 withdrawn deals. Deals made by derivatives users have a higher absolute transaction value but lower relative deal size against acquirer size. Deals made by derivatives users are also less likely to involve equity as a payment method. Hedgers are more likely to have larger firm size, higher leverage, and greater pre-deal ROA. On the other hand, hedgers are found to have smaller cash holding, Runup, and Sigma. We do not find a statistically significant difference in Tobin's Q between the user and nonuser groups.[16]

"providing a 'natural hedge'" as an important factor in their decision about issuing foreign debt. In a recent study, Clark and Judge (2016) compare the effect on firm value of different FX hedging strategies and conclude that financial derivatives are used by firms to hedge short term risk exposures while foreign currency denominated debts are used to hedge long term risk exposures. Previous hedging studies have also examined the use of commodity derivatives for firms in certain industries with strong commodity price risk exposure (e.g., Jin and Jorion, 2006; Carter et al., 2006). Commodity price risk is not directly related to cross-border M&A and only affects a small number of industries, so hedging by commodity derivatives are expected to be much less correlated with deal outcomes than hedging by FCD or IRD.

[16]This does not conflict with the findings in previous hedging literature, because Tobin's Q is not compared cross-sectionally in our sample.

5 Empirical results

5.1 Financial hedging and acquirer CARs: OLS

To examine the effect of financial hedging on cross-border deal performance, we study acquirer CARs estimated by a market model with the CRSP value-weighted index. Following Golubov et al. (2015), the market model is estimated using at least 30 non-missing daily return data over the $(-300, -91)$ period prior to the deal announcement. Acquirer CARs are measured over a window of $(-5, +5)$, where day 0 is the deal announcement date.[17]

Table 2 reports the results of ordinary least squares (OLS) regressions with robust standard errors for the 1,276 completed deals. The dependent variables in all seven regressions are acquirer announcement CARs. The independent variables of interest are corporate financial hedging proxy variables: the foreign currency derivatives user indicator (Fcd), the derivatives user indicator (Fcd/Ird),[18] the hedging scope indicator (Hedging_scope), and the notional value of financial derivatives normalized by acquirers' total assets (NV_derivatives). We control for year, Fama–French 10 industry, and S&P index fixed effects in all regressions.

In columns 1–4, Fcd is the key independent variable of interest. In column 1, we do not include any control variables. We control for deal characteristics in column 2 and then add acquirer characteristics in column 3. In column 4, we add one more control variable, Foreign_debt, to control for the impact of foreign currency denominated debt on acquirer FX exposures (Kedia and Mozumdar, 2003; Allayannis et al., 2003; Clark and Judge, 2016). The coefficients of Fcd remain positive and statistically significant in all four regressions. These results show that acquirers engaged in FX risk hedging activities have significantly higher announcement CARs than acquiers

[17] As a robustness check, we also estimate the market model over the alternative period of $(-260, -60)$, $(-200, -20)$, and $(-200, -60)$, and check alternative CAR estimation windows of $(-3, +5)$ and $(-1, +5)$. In addition, we estimate acquirer CARs using the Fama–French three-factor model (Fama and French, 1993) and the Carhart four-factor model (Carhart, 1997). The results are qualitatively the same using these specifications.

[18] We do not include Ird as an independent hedging variable because the direct effect of IR risk hedging on acquirer CARs is conditional on the issuance of debt by acquirers to finance cross-border M&As. Instead, we include Fcd/Ird as a hedging variable to account for whether an acquirer has an established hedging program or not.

that do not. The improvement of CARs is not only statistically significant but also economically important. Using the regression model specified in column 4, we estimate that foreign currency derivatives users experience an average 1.0% higher announcement CARs than nonusers. This is equivalent to an increase of $193.7 million shareholder value for an average-sized acquirer.

We then replace the hedging variable of Fcd with Fcd/Ird, which is a broader indicator of hedging that takes into account the use of both foreign currency derivatives and interest rate derivatives. The coefficient of Fcd/Ird is also positive and statistically significant as reported in column 5. The hedging effect remains statistically significant when we use Hedging_scope as the hedging variable in column 6 and NV_derivatives[19] in column 7. Overall, our results are consistent with Hypothesis 1 that derivatives users have higher acquirer CARs than nonusers. In addition, we find acquirers that hedge more types of risks (Hedging_scope) and have higher derivatives contract values (NV_derivatives) experience higher announcement returns.

5.2 Financial hedging and acquirer CARs: Heckman two-stage procedure

The endogeneity concern on our test results emerges if financial hedging decisions are not randomly distributed among firms, but are related to certain unobservable firm characteristics that have a positive impact on acquirer announcement returns. If that is the case, an acquirer who uses financial derivatives would have higher CARs no matter it engages in financial hedging or not. The ideal approach to address this self-selection bias is to compare deal outcomes of the same acquirer, with and without financial hedging. Since this is not practical, we adopt the Heckman treatment effect model: a linear regression model augmented with an endogenous binary treatment variable (Heckman, 1978; Wooldridge, 2010). The estimation is conducted by a two-step consistent estimator. The first-step treatment equation models the choice of using financial derivatives, and

[19]Over our sample period 2000–2014, U.S. public companies are only required to report the fair value of their derivatives positions but not the notional value. Although we find that most companies who report derivative information in their annual report choose to report both values, the notional value of derivatives as measured by NV_derivatives is a still a noisy proxy for hedging and suffers self-selection biases in reporting. Therefore, we focus on hedging indicator variables in the rest of our empirical analysis.

the second-step outcome equation corrects for the omitted variables and selection biases.

The key to implementing the two-step treatment effect estimation is to identify instrument variables that strongly correlate to a firm's hedging decision but not its announcement return. We employ two instrument variables in our tests: Analyst_number and Foreign_sales/Sales. Geczy et al. (1997) find that both the number of financial analyst firms following and the ratio of foreign sales to total sales are related to the likelihood that a firm uses currency derivatives. The number of following financial analysts may measure information asymmetry so that more analyst following is positively related to the availability of information, leading to a less need for managers to use derivatives hedging as a signaling tool (DeMarzo and Duffie, 1995). An alternative explanation is that the number of following analysts is a proxy for the pressure that managers receive on their firm performance (Geczy et al., 1997). Thus, the more analysts following a firm, the higher probability that the firm will engage in financial hedging to reduce the variation in firm performance. The ratio of foreign sales to total sales measures an acquirer's exposure to foreign currency risk before the M&A deal. Therefore, higher foreign currency risk exposure is associated with greater potential hedging benefits and leads to a higher probability of FX hedging (Kedia and Mozumdar, 2003).[20]

Table 3 presents the two-step treatment effect test results. In the first-step treatment regressions, we conduct probit tests in which the dependent variable of interest is Fcd in model 1–2 and Fcd/Ird in model 3–4. Analyst_number is the instrument variable employed in model 1 and 3, while Foreign_sales/Sales is the instrument variable employed in model 2 and 4. The coefficients of both instrument variables are statistically significant in the first-step treatment equations. In the second-step outcome equations, the dependent variables are acquirer CARs estimated by the

[20]The pairwise correlation between acquirer CARs and the number of following financial analysts is -0.09, and the pairwise correlation between acquirer CARs and the ratio of foreign sales to total sales is 0.03. To avoid overidentification, we use Analyst_number and Foreign_sales/Sales separately as instrument variables in the first-step treatment equation. Our results are qualitatively the same when we combine the two instrument variables together in the first-step treatment equation. Unlike the standard instrumental variables and two-stage least squares (2SLS) regressions, the Heckman model does not require exclusion restrictions to be estimated (e.g., Li and Prabhala, 2007; Golubov et al., 2012). The relevance condition of our two instruments is examined in the first-stage regression. The corresponding p-value for the joint test whether the excluded instruments are significant is 0.000, suggesting that the relevance condition is satisfied.

market model. Similar to the OLS regression results, the coefficients of Fcd and Fcd/Ird are both positive and statistically significant in the second-step regressions. The Heckman two-stage test results confirm our findings on the positive relation between hedging and acquirers CARs when endogeneity is addressed.

5.3 Other deal related outcomes

In this section, we investigate whether financial hedging affects the deal completion probability and deal completion time.

5.3.1 Financial hedging and deal completion probability

Columns 1–4 of Table 4 report the results of the probit regressions of deal completion probabilities on three measures of acquirer financial hedging activities: Fcd, Fcd/Ird, and Fcd_target. In the first two regressions, the coefficients of the financial hedging variables, Fcd and Fcd/Ird, are not statistically significant. In the remaining regressions, the hedging variable employed is Fcd_target, which is a dichotomous variable indicating if the acquirer uses currency derivatives specifically to hedge the target nation's currency risk. We find the regression coefficients for Fcd_target to be positive and statistically significant in the probit regressions reported in columns 3 and 4. This suggests that if an acquirer holds the target nation's currency derivatives contracts prior to the deal announcement, the probability of deal completion is higher. Using the model specification of column 4 as an example, the untabulated marginal effect coefficients show that holding all the other independent variables at their mean value, acquirers that hedge the target country's currency risk have a 4% higher probability of completing their deals than acquirers that do not. As a robustness check, we then conduct a logit regression with the same control variables as column 4. The results are reported in column 5, which show that the coefficient of Fcd_target remains positive and statistically significant. Overall our findings are consistent with Hypothesis 2.

Apart from the impact of the hedging policy, we find that a deal is more likely to be successful

when the target is a non-public rather than a public firm. One possible explanation is that shares of private companies are more concentrated (Golubov et al., 2012) and the voting process for private companies is less complicated than for public companies. We also find that acquirers with better governance mechanisms exhibit stronger abilities to get their deals closed. Consistent with Golubov et al. (2012), we find that tender offers have a positive effect on the deal completion probability, while hostile deals and sigma value have a negative effect on the chance of deal completion.

5.3.2 Financial hedging and deal completion time

The univariate tests in Panel D of Table 1 show that it takes FX derivatives users an average of 53 days to close a deal, while it takes nonusers an average of 42 days to do so. Table 5 reports the tobit regression [21] results on how an acquirer's hedging behavior affects its deal completion time. The dependent variable is Completion_time, which is defined as the number of calendar days between the deal announcement date and deal completion date. Various acquirer and deal characteristics are controlled for in the regressions. Similar to the univariate test results, we find that all coefficients of hedging variables are positive and statistically significant. This is consistent with Hypothesis 3 that it takes derivatives users longer to close cross-border M&As deals than nonusers. Specifically, it takes an acquirer with FX hedging experience 32 days more to complete a cross-border M&A than a firm without such experience, after controlling for deal and firm characteristics.

Besides the hedging variables, our results are consistent with Golubov et al. (2012) that deals involving acquirers and targets from the same industry and deals with a large transaction value relative to acquirer size have a longer completion time, while deals made by acquirers whose stocks experience high volatility prior to the deal announcement have a shorter completion time. We also find that acquirers' outstanding foreign currency denominated debt has a significantly positive

[21] In our cross-border M&A sample, some deals have a completion time of 1 day. The tobit regression adjusts for the left-censoring observations at 1.

effect on deal completion time. In addition, we find that tender offers have a negative effect on completion time in cross-border M&As.[22]

5.4 Financial hedging and long-term performance

Our analysis so far suggests that derivatives users take a longer time to negotiate and complete deals, have a higher deal completion probability, and, most importantly, experience higher announcement returns than nonusers. In this section, we explore whether the benefits of hedging are capitalized in acquirer long-term performance. In particular, we explore the difference in both long-term operating performance and stock performance between derivatives users and nonusers.

Following Huson et al. (2004) and Guercio et al. (2008), we use changes in abnormal operating return on assets (△AROA) to measure acquirer post-merger long-term operating performance. We first compute ROA as the ratio of operating income to the book value of total assets. Then, following Barber and Lyon (1996), we adjust an acquirer's ROA by subtracting the median ROA of a control group of firms that are from the same industry (2-digit SIC code) and have similar prior operating performance (±10% ROA).[23] This procedure generates adjusted return on assets (AROA), which controls for the mean reversion in the accounting performance of firms experiencing substantial corporate events or extreme performance. Lastly, we compute the change in AROA (△AROA) over a three-year window starting from the deal announcement.

Columns 1–3 of Table 6 present the multivariate regression results of hedging on acquirer long-term operating performance. We use three measures to identify acquirers' hedging programs: Fcd, Fcd/Ird, and Hedging_scope. After controlling for various acquirer and deal characteristics, the coefficients of the three hedging measures are all positive and statistically significant. Our results show that financial hedging improves an acquirer's long-term operating performance after

[22]Tender offers are not common in cross-border M&As. In our sample only about 6% of the deals involve tender offers.

[23]When the above criteria yield no firms in the control group, we relax the same 2-digit SIC code requirement to the same 1-digit SIC code, or further remove the industry requirement completely. If we still cannot find any firms in the control group, we choose the firm with the closest ROA in the fiscal year prior to the deal announcement.

cross-border M&As. The impact is more pronounced for acquirers that hedge more types of risk exposures. On average, the use of FX derivatives increases acquirer △AROA by 0.7% over three years after the deal announcement.

We next examine the post-deal long-term stock performance of acquirers. As noted by Kothari and Warner (2007), risk adjustment is critically important in assessing the long-term performance of event studies, and risk should be estimated based on the stock performance after the event. To measure post-deal long-term stock performance, we calculate BHAR by the control-firm method in order to reduce any biases resulting from new listing, rebalancing, and skewness. Following Barber and Lyon (1997) and Lyon et al. (1999), for each acquirer in our sample, we identify a firm with similar size and book-to-market ratio as the benchmark. Furthermore, as pointed out by Duchin and Schmidt (2013), one of the major concerns about long-term event studies in M&As is the clustering of merger activities at the industry level, which could result in biased testing results if we assume the independence of stock returns across different firms. To mitigate this concern, we further require benchmark firms to be in the same industry as the acquirers. In summary, we match each acquirer with a firm from the same industry (2-digit SIC code), of similar size (±10%), and with the closest book-to-market ratio. The BHAR are calculated over a three-year window after the deal announcement.[24]

Columns 4–6 of Table 6 presents the results on long-term stock performance test. After controlling for various acquirer and deal characteristics, the coefficients of the three hedging measures are positive and statistically significant. Our results show that financial hedging is associated with increased acquirer long-term stock performance. The impact is more pronounced for acquirers that hedge more types of risk exposures. On average, the use of FX derivatives increases acquirer annual BHAR by 0.4% over three years after the deal announcement.

Overall, the results in Table 6 are consistent with Hypothesis 4 and illustrate that the benefits

[24]We repeat our tests with long-term performance measured over a four-year and five-year time window, respectively. The results are qualitatively the same and are available upon request.

of hedging for acquirers extend well beyond short-term performance improvement. Over a longer time horizon, both the operating performance and stock market performance of derivatives users surpass those of nonusers.

6 Robustness tests and further discussions

In this section, we discuss the alternative explanations of our findings and present robustness test results.

6.1 Alternative explanations and omitted variables

The acquirer's financial hedging decision may be related to omitted factors that also affect M&A outcomes. To address this concern, we investigate whether the positive relation between financial hedging and acquirer CARs can be explained by a series of alternative explanations.

6.1.1 Financial hedging and managerial ability

One alternative explanation for the positive effect of financial hedging on deal performance is that both hedging and deal performance are driven by manager quality. Derivatives using may just be the result of talented management teams and good business strategies. To examine whether "better managerial ability" is the only interpretation of our results, we specifically control for managerial ability in our regressions and check the robustness of our results.

Demerjian et al. (2012) apply data envelopment analysis and build a managerial ability score index based on a manager's efficiency in transforming corporate resources to revenues. They find that this managerial ability index is strongly associated with manager fixed effects and can explain the stock price reaction to CEO turnovers. We obtain managerial ability score (Managerial_score) data between 2000 and 2011 from Peter Demerjian's website[25] and include Managerial_score as a

[25] http://faculty.washington.edu/pdemerj.

control variable in our analysis.

Panel A of Table 7 reports the test results of financial hedging on acquirer CARs after controlling for managerial ability. We use the endogenous binary-treatment model estimated by a two-step consistent estimator, with similar specifications to the models shown in Table 3. only the second-step outcome equation regression results are reported. The coefficients of Fcd and Fcd/Ird remain positive and statistically significant in all the outcome equations, suggesting that "better managerial ability" story cannot fully account for our findings. The coefficient of Managerial_score is statistically significant but negative. An explanation consistent with this result is the hubris hypothesis (e.g., Roll, 1986; Malmendier and Tate, 2005) that good past performance tends to induce CEO hubris so that acquirers choose improper targets or overpay deal premium, leading to an inferior deal performance.

6.1.2 Acquirer CARs and foreign operating exposures

If an acquirer has foreign operation in the target firm's country before the M&A deal, then it may be motivated to hedge its FX risk related to its foreign operating exposures. On the other hand, an acquirer with target country operation experience may also make better cross-border M&A decisions. Thus, it might be the acquirer's knowledge of foreign markets rather than the financial hedging itself that leads to the improved deal performance documented in our empirical tests. In this section, we address the concern that omitting an acquirer's pre-deal operating exposures in the target nation may introduce an estimation bias in our empirical analysis.

Since foreign sales and foreign production information on the country level is not disclosed by the acquirers, we adopt an alternative approach to measure their foreign exposures. Garcia and Norli (2012) extract state name counts from 10-K reports and use the counts as a measure of the degree of geographic dispersion of firm business operations. Following their approach, we count the number of mentions of foreign target nations (Counts) in acquirer 10-K reports prior to the

deal announcement.[26] The variable Counts is used as a proxy for an acquirer's foreign operation experience and knowledge of the target nation before the M&A deal.

Panel B of Table 7 presents the test results of financial hedging on acquirer CARs after controlling for acquirer foreign operation experience. We use the endogenous binary-treatment model estimated by a two-step consistent estimator. Only the second-step outcome equation regression results are reported. The coefficient of Counts is found to be statistically insignificant in our results. The coefficients of Fcd and Fcd/Ird remain positive and statistically significant in all the outcome equations.

6.1.3 Acquirer CARs and serial acquirers

Some deals in our sample are carried out by repeated acquirers. If the improvement on acquirer CARs is driven by the frequent acquirers who are also more likely to use derivatives, then the conclusion of our empirical results is compromised. In our sample of 1,369 cross-border M&A deals, there are 639 unique acquirers, about half of whom (316) carry out a single transaction in our sample. There is a group of 55 frequent acquirers who carry out at least five deals. In order to address the concern that our results are driven by these frequent acquirers, we repeat our multivariate tests after dropping the deals made by these repeated acquirers from our sample. In untabulated test results, we find that hedging variables remain positively related to deal performance. Apart from the concern discussed above, recent M&A studies also demonstrate that if an acquirer makes a series of acqusitions, the acquirer CARs may decline as it conduct more deals (e.g., Billett and Qian, 2008; Aktas et al., 2011). We control for the variable Serial_acquirer in the outcome equation of the endogenous binary-treatment model. Serial_acquirer is defined as the number of deals carried out by the same acquirer before the deal announcement in our sample. As shown in Panel C of Table 7, our results are robust after controlling for the serial acquirer effect.

[26] The variations, including official names, unofficial names, and their adjectival forms, are all considered when we count the mentions of target nations.

6.1.4 Acquirer CARs and commodity derivatives

Besides FX and IR derivatives, companies may also use commodity derivatives for hedging purpose. Empirical studies on commodity price hedging usually examine firms in industries with strong risk exposure to commodity prices.[27]

One alternative interpretation of our empirical findings on the positive relation between acquirer CARs and financial hedging is that the better deal performance is driven by unobserved firm qualities that lead firms to hedge, instead of driven by hedging practice itself. In other words, financial hedging may have no causal effect on deal performance but only signals unobserved firm qualities. If this explanation is true, then the use of commodity derivatives should have similar correlations with acquirer announcement returns as the use of FCD or IRD.

To check on this alternative interpretation, we add Commodity as a control variable in the outcome equation of the endogenous binary-treatment model. Commodity is a binary variable that is equal to 1 if an acquirer reports using commodity derivatives, and 0 otherwise. Panel D of Table 7 shows that the coefficients of Fcd and Fcd/Ird remain positive and statistically significant in all the outcome equations. The coefficients of Commodity in the outcome equations are mostly negative and statistically insignificant. In untabulated tests, we examine the impact of commodity price hedging on acquirer CARs without controlling for FCD and IRD. We find that the commodity derivatives alone cannot contribute to better deal performance. These findings alleviate the concern that financial hedging only signals hidden firm characteristics.

Finally, we include all four control variables: Managerial_score, Counts, Serial_acquirer, and Commodity together in the multivariate regressions shown in Panel E of Table 7. We continue to find that financial hedging is positively related to acquirer CARs.

[27] For example, Carter et al. (2006) study the use of jet fuel derivatives in a sample of U.S. airline companies and find that commodity price hedging is positively related to Tobin's Q. By focusing on a sample of oil refiners, Mackay and Moeller (2007) also find similar results.

6.1.5 Acquirer CARs and financial hedging: unobservable firm characteristics

To further control for the unobserved acquirer or target characteristics that could affect both financial hedging and acquirer CARs, we follow Gormley and Matsa (2014) and control for the triple fixed effects of Year × Acquirer Fama–French 10 industry × Target Fama–French 10 industry.[28] For all seven OLS regressions in Table 2, we re-estimate them with the triple fixed effects model. Results in Table 8 show that our empirical results presented in Table 2 remain robust.

6.2 Alternative endogeneity control method: propensity score matching (PSM)

In section 5.2, we apply the Heckman selection model to control for the endogeneity concern due to self-selection bias and unobserved firm characteristics. As an alternative approach, we follow Bartram et al. (2011) and employ a self-selection control method, PSM, by matching the derivatives users with a group of nonusers with similar pre-acquisition firm characteristics.

For each acquirer, we generate a propensity score which is estimated by a logit model. The dependent variable in the logit model is Fcd, and the independent variables include Leverage, Cash/assets, Governance, Tobin's Q, and Relative_size. We choose these independent variables because Caliendo and Kopeinig (2008) argue that the independent variables in the first step regression should strongly affect the implementation of financial hedging program and at least weakly affect the outcome variables. Then we match deals carried out by derivatives users with those carried out by a group of nonusers based on their propensity scores. Both nearest-neighbour matching and Gaussian kernel matching methods are applied. The differences in deal outcomes between derivatives users and nonusers are then estimated and reported in Table 9. Our findings in section 5 remain robust with the PSM approach.

[28] We thank Todd A. Gormley for providing the computer code of the high dimensional fixed effect model online at www.kellogg.northwestern.edu/faculty/matsa/htm/fe.htm.

6.3 Currency volatility and announcement returns

Market uncertainty is critically influential on M&A activities. In cross-border M&As, high currency volatility introduces great uncertainty for the deals. High currency volatility not only increases an acquirer's payment risk during the interim period, but also increases its subsequent cash flow risk and balance-sheet risk. As a result, we expect that financial hedging will have a greater impact on deal performance during a high exchange rate volatility regime than during a low exchange rate volatility regime.

In the internet Appendix C1, we use the standard deviations of 12 monthly trade-weighted U.S. dollar index returns prior to the deal announcement and the standard deviations of 12 monthly returns of exchange rates between the U.S. dollar and the target nation's currency prior to the deal announcement as two measures of foreign currency volatility. Then we run OLS regressions of acquirer CARs on acquirer's financial hedging proxy variables over high currency volatility and low currency volatility periods, respectively. We find that the coefficients for all financial hedging measures are positive and statistically significant when the deals are announced following a period of high currency volatility, but the coefficients become positive yet statistically insignificant when they are announced after a period of low currency volatility. These findings lend support to the notion that financial hedging improves acquirer performance through risk reduction and the effect is more significant during volatile times.

6.4 Other hedging methods

Besides hedging with derivatives, financial hedging with foreign currency debt and operational hedging are also commonly used methods by firms to reduce their foreign currency exposures. A firm with foreign currency risk exposures may finance its operation in the local nation's currency to create a natural hedge (Graham and Harvey, 2001). This approach is commonly used by firms with long-term exposures of foreign currency risk (Clark and Judge, 2016). In our main tests, we

include foreign currency denominated debt as a control variable and the coefficients of our hedging proxies are statistically significant. This is not surprising given that a portion of risk exposures associated with cross-border M&As are in the near future and at a predictable amount, which can most effectively be managed by financial derivatives hedging. Our findings suggest that it is beneficial for acquirers to hedge these risk exposures with financial derivatives, even if the certain acquirers may adopt natural hedge through borrowing in local currencies as a complement.

Operational hedging refers to the strategy that a firm relocates its production facilities or shifts its source of inputs in order to match the costs and revenues in the same currency. Kim et al. (2006) find a substitute relation between financial hedging and operational hedging for non-financial firms. Hankins (2011) finds that for a sample of firms in the U.S. financial industry, M&As provide operational hedging by reducing the volatility of the combined entity's operational income. We cannot rule out that certain cross-border acquisitions in our sample are for operational hedging purpose. If this is the case, then the marginal benefits of derivatives hedging will be smaller. The fact that we find a significant effect of financial hedging on deal performance, given that some deals may be carried out for the operational hedging purpose, only makes our findings more significant.

6.5 Target country fixed effects

In our sample, an acquirer may have different risk exposures in different target countries and the difference is not random. Thus it may be necessary to control for target country fixed effects. The tests in section 6.3 are a sub-sample analysis based on country to country exchange rate volatilities, which partially addresses target country fixed effects. To further address this issue, we re-estimate the OLS regressions in Panel A of Table 2 and control for target country fixed effects. The test results remain qualitatively the same as reported in Panel A of Table 2.[29]

[29]The untabulated test results are available upon request.

6.6 Financial hedging and acquirer stock return volatility

High stock return volatility leads to higher external financing costs and more uncertainty on payments if the method of payment includes stock swaps. From a large sample of international firms, Bartram et al. (2011) find strong evidence that the use of financial derivatives reduces both total risk and systematic risk. We examine the effect of hedging on stock return volatility in our sample as a performance test.

The stock return volatility measure we adopt is the implied volatility at the deal announcement, which reflects the market's expectation of an acquirer's future stock volatility. Following Duchin and Schmidt (2013), we collect acquirers' implied volatility data from the estimated volatility surface in the Option Metric database for ATM options with time to maturity of 91 days[30] and calculate the average implied volatility of ATM call and put options. In the internet Appendix C2, we use both univariate and multivariate tests to show that derivatives users have lower market perceived future stock return uncertainty than nonusers at announcement dates. On average, hedging with FX derivatives reduces an acquirer's 91-day implied volatility by 0.047 at the announcement date.

6.7 Financial hedging reported after the deal announcement

The financial hedging data employed in this study are collected from the acquirer's annual report filed prior to the deal announcement. This practice is consistent with the standard event study approach in M&A literature and mitigates the reverse causality concern. However, some deal specific hedging activities by acquirers may occur during the fiscal years when the M&As are announced and are subsequently disclosed in the 10-K reports available after the deal announcement. In this case, the financial hedging information reported after the deal announcement would also be of interest. In addition, given that deal specific hedging information is not disclosed by all

[30] We also collect data for options with time to maturity of 30 days and 60 days. Our test results are qualitatively the same and are available upon request.

acquirers, the change of financial hedging activities reported in the two consecutive annual reports before and after deal announcement can offer some insight on deal related hedging activities. To further explore the link between hedging programs and cross-border M&A activities, we hand collect acquirers' financial hedging data from their annual reports filed for the fiscal years in which the deals are announced.[31]

In the untabulated results, we find that the means of Fcd, Fcd_target, Hedging_scope, Nv_derivatives, and Foreign_debt are significantly higher in the annual reports filed after the deal announcement than those before the deal announcement, suggesting that in anticipation of deal completion, the acquirers increase their FX hedging activities around the deal announcement. The hedging activities related to IR risk and commodity price risk do not increase significantly over the two-year time period. Furthermore, we find that financial hedging activities reported after the deal announcement have a similar effect on acquirer announcement returns as those reported before the deal announcement. The results in Table 3 are robust when we use Fcd and Fcd/Ird reported after the deal announcement as the independent variable for hedging. Finally, we calculate the change of hedging activities between the two fiscal years (ΔHedging_scope and ΔNv_derivatives) and find that both of them have a positive effect on acquirer announcement returns.

7 Conclusions

Using hand-collected data on reported derivatives information by S&P 1500 firms that acquire foreign targets between 2000 and 2014, we empirically examine whether financial hedging affects cross-border M&A deal performance. Our sample acquirers encounter an increase in foreign exchange risk, as well as interest rate risk if a deal needs external financing. With an event study approach, we find that derivatives users have higher announcement returns than nonusers. The improvement on acquirer CARs is both statistically and economically significant. Over a time

[31] We thank an anonymous referee for suggesting this analysis.

window of $(-5, +5)$ around the deal announcement, foreign currency derivatives users experience an average 1% higher abnormal returns than nonusers. Besides improved acquirer CARs, we show that financial hedging correlates with higher deal completion probabilities, longer deal completion time, and better long-term acquirer performance.

Overall, our results are consistent with the optimal hedging theory that financial hedging improves firm value when market frictions exist. To address the endogeneity concern, we use the Heckman treatment effect model to control for hidden variables that may be correlated with both hedging decision and deal performance. In our robustness tests, we apply both the PSM and the triple fixed effects models to further mitigate potential endogeneity. To rule out the alternative explanations of our results, we conduct a series of robustness tests to directly control for specific firm or deal characteristics, including firm size, stock return momentum, managerial ability, foreign operating exposures, repeated acquirers, and target country fixed effects. Our results remain robust after controlling for these variables. Adding commodity price hedging as a control variable, we find that unlike foreign exchange and interest rate hedging, commodity hedging does not correlate with better deal performance. This lends support to the notion that hidden firm characteristics motivating firms to hedge cannot fully explain the improved deal performance. Furthermore, by separating our sample period into a low exchange rate regime and a high exchange rate regime, we confirm that hedging related acquirer performance improvement is more pronounced during a high currency volatility regime than a low currency volatility regime. This reinforces the notion that hedging benefits firms through risk exposure reduction. Lastly we show that the implied volatility for derivatives users is lower than for nonusers during the deal announcement window. The observed risk reduction effect is consistent with Bartram et al. (2011).

Our findings contribute to the extant literature on the link between hedging and firm value improvement. To our knowledge, this is the first study to directly examine the relation between hedging and the performance of a firm's investment activity. Similar to previous M&A studies, we

only observe and examine deals that are made public. Boone and Mulherin (2007) find that public takeover activities are only the tip of the iceberg of total takeover activities. It is possible that some deals are not made public due to the lack of acquirer capacity to manage deal related risks, which further emphasizes the importance of financial hedging in cross-border M&As. The current U.S. financial statement reporting standards do not require firms to disclose deal specific hedging information. Therefore we follow the practice of the extant empirical hedging studies and collect general hedging information at the firm level. If changes in financial reporting standards make more detailed corporate hedging data available in the future, we would be able to not only study the relation between hedging and cross-border M&As more thoroughly but also examine hedging's impact on other types of firm operation.

Appendix A

See Table A1.

Table A1: Variable definitions

This table provides variable definitions and corresponding data sources. CRSP refers to the Centre for Research in Security Prices, FF refers to Kenneth French's website at Dartmouth, SDC refers to Thomson Reuters Securities Data Company, IBES refers to the Institutional Brokers Estimate System, ISS refers to the Institutional Shareholder Services (formerly RiskMetrics), and EDGAR refers to the SEC Electronic Data Gathering, Analysis, and Retrieval.

Variable	Definition	Source
Deal outcomes		
$CAR\_[X,Y]$	Cumulative abnormal returns over the event window $[X,Y]$ days surrounding the acquisition announcement, using the market model with the CRSP value-weighted index.	CRSP
Completion	1 for completed deals, 0 for withdrawn deals.	SDC/LexisNexis
Completion_time	Number of days between announcement and effective dates.	SDC/LexisNexis
AROA	Acquirer abnormal return on assets (AROA) with the benchmark being the median ROA of a group of Compustat firms within the same 2-digit SIC code and similar operating performance (±10% ROA) before the deal announcement.	Compustat
BHAR (Control Firm)	Acquirer buy-and-hold abnormal stock return with the benchmark being the return of a control firm with the same 2-digit SIC code, similar size (±10%), and the nearest book-to-market ratio.	Compustat/CRSP /FF Data Library
Implied volatility	The implied volatility of acquirer stock returns at the deal announcement. It is the average implied volatilities of the at-the-money (ATM) call option and the ATM put option with the same maturity.	Option Metrics
Deal characteristics		
Cash	1 for deals financed fully with cash, 0 otherwise.	SDC
Equity	1 for deals financed partially or fully with stock, 0 otherwise.	SDC
Nonpublic	1 if the target is not a public firm, 0 otherwise.	SDC
Toehold	1 if the acquirer has already held a certain percentage of the target shares at the announcement, 0 otherwise.	SDC
Hostile	1 for hostile deals, 0 otherwise.	SDC
Tender	1 for tender offers, 0 otherwise.	SDC
Related_industry	1 if the target and the acquirer have the same 2-digit SIC code, 0 otherwise.	SDC
Relative_size	The ratio of transaction value to acquirer market value at the end of the fiscal year before the deal is announced.	SDC/Compustat
Transaction_value	Value of transaction, in million dollars.	SDC
Firm characteristics		
Size	Natural log of acquirer's market value, adjusted for inflation.	Compustat
Tobin's Q	Acquirer's Tobin's Q at the end of the fiscal year before the deal is announced, following Baker and Wurgler (2002).	Compustat

Continued on next page

Table A1 – continued from previous page

Variable	Definition	Source
Leverage	Acquirer's ratio of book value of debt to book value of total assets in fiscal year end before the deal is announced.	Compustat
Cash/assets	Acquirer's cash, normalized by total assets.	Compustat
Governance	We construct a corporate governance index based on six provisions (Bebchuk et al., 2009). Each acquirer is given a score, from 0 to 6, based on the number of these provisions which the company has before the announcement: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments.	ISS
Runup	Market adjusted buy-and-hold return of the acquirer's stock over a $(-205, -6)$ window (Golubov et al., 2012).	CRSP
Sigma	Standard deviation of the acquirer's market-adjusted daily return over a $(-205, -6)$ window (Golubov et al., 2012).	CRSP
Assets	Book value of acquirer total assets .	Compustat
Analyst_number	Number of analysts following the acquirer in the fiscal year preceding the deal announcement (Geczy et al., 1997).	IBES
Foreign_sales/Sales	The ratio of the acquirer's foreign sales over its total sales at the end of the fiscal year preceding the deal announcement.	Compustat Segments
ROA	Operating income before depreciation divided by total assets.	Compustat
Managerial_score	A measure of managerial ability based on managers' efficiency in generating revenues (Demerjian et al., 2012).	Peter Demerjian's website
Counts	The number of mentions of the target country in the acquirer's 10-K report prior to the deal announcement.	EDGAR 10-K
Serial_acquirer	The number of deals carried out by the same acquirer before the deal announcement in our sample.	SDC
Acquirer financial hedging characteristics		
Fcd	1 if the acquirer uses foreign currency derivatives in the fiscal year before the deal announcement, 0 otherwise.	EDGAR 10-K
Fcd_target	1 if the acquirer uses the target nation's currency derivatives in the fiscal year before the deal announcement, 0 otherwise.	EDGAR 10-K
Ird	1 if the acquirer uses interest rate derivatives in the fiscal year before the deal announcement, 0 otherwise.	EDGAR 10-K
Fcd/Ird	1 if the acquirer uses either foreign currency derivatives or interest rate derivatives in the fiscal year before the deal announcement, 0 otherwise.	EDGAR 10-K
Hedging_scope	2 if the acquirer uses both of the two types of derivatives contracts (FX and IR) in the fiscal year before the deal announcement, 1 if the acquirer uses only one of the two types of derivatives contracts (FX or IR), 0 if the acquirer does not use foreign currency derivatives or interest rate derivatives.	EDGAR 10-K
Nv_derivatives	Notional value of the financial derivatives contracts held by the acquirer at the end of the fiscal year before the deal announcement, normalized by the acquirer's total assets.	EDGAR 10-K
Foreign_debt	1 if the acquirer uses debt denominated in foreign currencies in the fiscal year before the deal announcement, 0 otherwise.	EDGAR 10-K/SDC Global New Issues
Commodity	1 if the acquirer uses commodity derivatives contracts in the fiscal year before the deal announcement, 0 otherwise.	EDGAR 10-K

References

Ahern, K. R., Sosyura, D., 2014. Who writes the news? Corporate press releases during merger negotiations. Journal of Finance 69, 241–291.

Aktas, N., Bodt, E. D., Roll, R., 2011. Serial acquirer bidding: An empirical test of the learning hypothesis. Journal of Corporate Finance 17, 18–32.

Allayannis, G., Brown, G. W., Klapper, L. F., 2003. Capital structure and financial risk: Evidence from foreign debt use in East Asia. Journal of Finance 58, 2667–2709.

Allayannis, G., Ihrig, J., 2001. Exposure and markups. Review of Financial Studies 14, 805–835.

Allayannis, G., Ihrig, J., Weston, J. P., 2001. Exchange-rate hedging: Financial versus operational strategies. American Economic Review 91, 391–395.

Allayannis, G., Ofek, E., 2001. Exchange rate exposure, hedging, and the use of foreign currency derivatives. Journal of International Money and Finance 20, 273–296.

Allayannis, G., Weston, J. P., 2001. The use of foreign currency derivatives and firm market value. Review of Financial Studies 14, 243–276.

Baker, M., Wurgler, J., 2002. Market timing and capital structure. Journal of Finance 57, 1–32.

Barber, B. M., Lyon, J. D., 1996. Detecting abnormal operating performance: The empirical power and specification of test statistics. Journal of Financial Economics 41, 359–399.

Barber, B. M., Lyon, J. D., 1997. Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. Journal of Financial Economics 43, 341–372.

Bartram, S. M., Brown, G. W., Conrad, J., 2011. The effects of derivatives on firm risk and value. Journal of Financial and Quantitative Analysis 46, 967–999.

Bartram, S. M., Burns, N., Helwege, J., 2013. Foreign currency exposure and hedging: Evidence from foreign acquisitions. The Quarterly Journal of Finance 3, 1350010.

Bebchuk, L. A., Cohen, A., Ferrell, A., 2009. What matters in corporate governance? Review of Financial Studies 22, 783–827.

Bhagwat, V., Dam, R., 2014. Aysmmetric interim risk and deal terms in corporate mergers and acquisitions. Working Paper.

Bhagwat, V., Dam, R., Harford, J., 2016. The real effects of uncertainty on merger activity. Working Paper.

Billett, M. T., Qian, Y., 2008. Are overconfident CEOs born or made? Evidence of self-attribution bias from frequent acquirers. Management Science 54, 1037–1051.

Bodnar, G. M., Hayt, G. S., Marston, R. C., 1998. 1998 Wharton survey of financial risk management by U.S. non-financial firms. Financial Management 27, 70–91.

Boone, A. L., Mulherin, J. H., 2007. How are firms sold? Journal of Finance 62, 847–875.

Brown, G. W., Crabb, P. R., Haushalter, D., 2006. Are firms successful at selective hedging? Journal of Business 79, 2925–2949.

Caliendo, M., Kopeinig, S., 2008. Some practical guidance for the implementation of propensity score matching. Journal of Economic Surveys 22, 31–72.

Campello, M., Lin, C., Ma, Y., Zou, H., 2011. The real and financial implications of corporate hedging. Journal of Finance 66, 1615–1647.

Carhart, M. K., 1997. On persistence in mutual fund performance. Journal of Finance 52, 57–82.

Carter, D. A., A.Rogers, D., Simkins, B. J., 2006. Does hedging affect firm value? Evidence from the U.S. airline industry. Financial Management 35, 53–86.

Chen, J., King, T.-H. D., 2014. Corporate hedging and the cost of debt. Journal of Corporate Finance 29, 221–245.

Clark, E., Judge, A., 2016. Foreign currency derivatives versus foreign currency debt and the hedging premium. European Financial Management, forthcoming.

DeMarzo, P. M., Duffie, D., 1995. Corporate incentives for hedging and hedge accounting. Review of Financial Studies 8, 743–771.

Demerjian, P., Lev, B., McVay, S., 2012. Quantifying managerial ability: A new measure and validity tests. Management Science 58, 1229–1248.

Duchin, R., Schmidt, B., 2013. Riding the merger wave: Uncertainty, reduced monitoring, and bad acquisitions. Journal of Financial Economics 107, 69–88.

Fama, E. F., French, K. R., 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics 33, 3–56.

Fama, E. F., French, K. R., 1997. Industry costs of equity. Journal of Financial Economics 43, 153–193.

Froot, K. A., Scharfstein, D. S., Stein, J. C., 1993. Risk management: Coordinating corporate investment and financing policies. Journal of Finance 48, 1629–1658.

Furfine, C. H., Rosen, R. J., 2011. Mergers increase default risk. Journal of Corporate Finance 17, 832–849.

Garcia, D., Norli, Ø., 2012. Geographic dispersion and stock returns. Journal of Financial Economics 106, 547–565.

Gay, G. D., Lin, C.-M., Smith, S. D., 2011. Corporate derivatives use and the cost of equity. Journal of Banking and Finance 35, 1491–1506.

Geczy, C., Minton, B. A., Schrand, C., 1997. Why firms use currency derivatives. Journal of Finance 52, 1323–1354.

Golubov, A., Petmezas, D., Travlos, N. G., 2012. When it pays to pay your investment banker: New evidence on the role of financial advisors in M&As. Journal of Finance 67, 271–311.

Golubov, A., Yawson, A., Zhang, H., 2015. Extraordinary acquirers. Journal of Financial Economics, Forthcoming.

Gormley, T. A., Matsa, D. A., 2014. Common errors: How to (and not to) control for unobserved heterogeneity. Review of Financial Studies 27, 617–661.

Graham, J., Harvey, C., 2001. The theory and practice of corporate finance: Evidence from the field. Journal of Financial Economics 60, 187–243.

Graham, J. R., Rogers, D. A., 2002. Do firms hedge in response to tax incentives? Journal of Finance 57, 815–839.

Guay, W. R., Kothari, S., 2003. How much do firms hedge with derivatives? Journal of Financial Economics 70, 423–461.

Guercio, D. D., Seery, L., Woidtke, T., 2008. Do boards pay attention when institutional investor activists "just vote no"? Journal of Financial Economics 90, 84–103.

Hankins, K. W., 2011. How do financial firms manage risk? Unraveling the interaction of financial and operational hedging. Management Science 57, 2197–2212.

Harford, J., 2005. What drives merger waves? Journal of Financial Economics 77, 529–560.

Heckman, J. J., 1978. Dummy endogenous variables in a simultaneous equation system. Econometrica 46, 931–959.

Huson, M. R., Malatesta, P. H., Parrino, R., 2004. Managerial succession and firm performance. Journal of Financial Economics 74, 237–275.

Jin, Y., Jorion, P., 2006. Firm value and hedging: Evidence from U.S. oil and gas producers. Journal of Finance 61, 893–919.

Kedia, S., Mozumdar, A., 2003. Foreign currency-denominated debt: An empirical examination. Journal of Business 76, 521–546.

Kim, Y. S., Mathur, I., Nam, J., 2006. Is operational hedging a substitute for or a complement to financial hedging? Journal of Corporate Finance 12, 834–853.

Kothari, S., Warner, J. B., 2007. Econometrics of event studies. In: Eckbo, B. E. (Ed.), Handbook of Corporate Finance, 1st Edition. Vol. 1. Elsevier, North-Holland, Amsterdam, pp. 3–36.

Leland, H. E., 1998. Agency costs, risk management, and capital structure. Journal of Finance 53, 1213–1243.

Li, K., Prabhala, N. R., 2007. Self-selection models in corporate finance. In: Eckbo, B. E. (Ed.), Handbook of Corporate Finance, 1st Edition. Vol. 1. Elsevier, North-Holland, Amsterdam, pp. 37–86.

Lin, C., Officer, M. S., Shen, B., 2014. Currency appreciation shocks and shareholder wealth creation in cross-border mergers and acquisitions. Working Paper.

Lin, J. B., Pantzalis, C., Park, J. C., 2009. Derivatives use, information asymmetry, and MNC post-acquisition performance. Financial Management 38, 631–661.

Lyon, J. D., Barber, B. M., Tsai, C.-L., 1999. Improved methods for tests of long-run abnormal stock returns. Journal of Finance 54, 165–201.

Mackay, P., Moeller, S. B., 2007. The value of corporate risk management. Journal of Finance 62, 1379–1419.

Malmendier, U., Tate, G., 2005. CEO overconfidence and corporate investment. Journal of Finance 60, 2661–2700.

Mayers, D., Smith, C. W., 1982. On the corporate demand for insurance. Journal of Business 55, 281–296.

Modigliani, F., Miller, M. H., 1958. The cost of capital, corporation finance and the theory of investment. American Economic Review 48, 261–297.

Moeller, S. B., Schlingemann, F. P., 2005. Global diversification and bidder gains: A comparison between cross-border and domestic acquisitions. Journal of Banking and Finance 29, 533–564.

Offenberg, D., Pirinsky, C., 2015. How do acquirers choose between mergers and tender offers? Journal of Financial Economics 116, 331–348.

Pérez-González, F., Yun, H., 2013. Risk management and firm value: Evidence from weather derivatives. Journal of Finance 68, 2143–2176.

Pritamani, M. D., Shome, D. K., Singal, V., 2004. Foreign exchange exposure of exporting and importing firms. Journal of Banking and Finance 28, 1697–1710.

Rhodes-Kropf, M., Robinson, D. T., Viswanathan, S., 2005. Valuation waves and merger activity: The empirical evidence. Journal of Financial Economics 77, 561–603.

Rhodes-Kropf, M., Viswanathan, S., 2004. Market valuation and merger waves. Journal of Finance 59, 2685–2718.

Roll, R., 1986. The hubris hypothesis of corporate takeovers. Journal of Business 59, 197–216.

Shleifer, A., Vishny, R. W., 2003. Stock market driven acquisitions. Journal of Financial Economics 70, 259–311.

Smith, C. W., Stulz, R. M., 1985. The determinants of firms' hedging policies. Journal of Financial and Quantitative Analysis 20, 391–405.

Stulz, R. M., 1984. Optimal hedging policies. Journal of Financial and Quantitative Analysis 19, 127–140.

Tufano, P., 1996. Who manages risk? An empirical examination of risk management practices in the gold mining industry. Journal of Finance 51, 1097–1137.

Wooldridge, J. M., 2010. Econometric Analysis of Cross Section and Panel Data, 2nd Edition. MIT Press, Cambridge, MA.

Table 1: Descriptive statistics

Panel A. Distribution of cross-border M&As by target country/region. This panel presents the numbers of cross-border M&A deals by target nation/region. Our final sample includes 1,369 cross-border M&As between 2000 and 2014. All acquirers are S&P 1500 companies in the U.S. and targets are from 58 different foreign countries or regions.

Nation	Freq.	Pct.	Nation	Freq.	Pct.	Nation	Freq.	Pct.	Nation	Freq.	Pct.
United Kingdom	294	21.48	Sweden	37	2.70	Japan	15	1.10	Hong Kong	6	0.44
Canada	219	16.00	India	36	2.63	Mexico	14	1.02	Poland	6	0.44
Germany	134	9.79	Brazil	32	2.34	Spain	13	0.95	Austria	5	0.37
France	89	6.50	Norway	22	1.61	Argentina	11	0.80	Luxembourg	5	0.37
Australia	57	4.16	Belgium	21	1.53	Finland	11	0.80	New Zealand	5	0.37
Israel	48	3.51	Denmark	20	1.46	Singapore	11	0.80	South Africa	5	0.37
Switzerland	46	3.36	Italy	20	1.46	Taiwan	10	0.73	Egypt	4	0.29
Netherlands	44	3.21	South Korea	19	1.39	Chile	9	0.66	Others	37	2.69
China	37	2.70	Ireland-Rep	18	1.31	Russian Fed	9	0.66	Total	1,369	100

Panel B. Distribution of cross-border M&As by acquirer industry. This panel presents the numbers of cross-border M&A deals by acquirer industry. Our sample includes 1,369 cross-border M&As between 2000 and 2014. All acquirers are S&P 1500 companies and targets are from 58 different foreign countries or regions. We assign 1,369 deal acquirers into Fama–French 10 industries based on acquirer SIC codes. Financial and public utilities industries are not included in our sample.

Fama–French 10 industries	Frequency	Percent
Business Equipment – Computers, Software, and Electronic Equipment	485	35.43
Manufacturing – Machinery, Trucks, Planes, Chemicals, Off Furn, Paper, Com Printing	380	27.76
Healthcare, Medical Equipment, Drugs	156	11.40
Consumer NonDurables – Food, Tobacco, Textiles, Apparel, Leather, Toys	89	6.50
Wholesale, Retail, and Some Services (Laundries, Repair Shops)	81	5.92
Other – Mines, Constr, BldMt, Trans, Hotels, Bus Serv, Entertainment	78	5.70
Oil, Gas, and Coal Extraction and Products	59	4.31
Consumer Durables – Cars, TVs, Furniture, Household Appliances	41	2.99
Total	1,369	100

Panel C. Summary statistics of hand coded variables. This panel presents the 1,369 cross-border M&A acquirers' hedging information which we collect from their 10-K reports on EDGAR. The sample period is between 2000 and 2014. All acquirers are S&P 1500 companies and targets are from 58 different foreign countries or regions. All variables are constructed in the fiscal year before the deal announcement. Detailed definitions of all variables can be found in Appendix A.

Variable	Obs.	Mean	Std. Dev.	p25	p50	p75
Fcd	1,369	0.632	0.482			
Fcd_target	1,219	0.374	0.484			
Ird	1,369	0.432	0.495			
Fcd/Ird	1,369	0.726	0.446			
Hedging_scope	1,369	1.064	0.780	1	1	2
Nv_derivatives (for hedgers)	820	0.129	0.371	0.025	0.078	0.159
Foreign_debt	1,369	0.199	0.399			
Commodity	1,369	0.198	0.399			

Panel D. Summary statistics of key dependent variables. This panel presents summary statistics of the key dependent variables in this paper. The sample includes 1,369 cross-border M&A deals between 2000 and 2014. All acquirers are S&P 1500 companies and targets are from 58 different foreign countries or regions. Summary statistics are presented for the full sample, financial derivatives user sample, and nonuser sample. Financial derivatives users are defined by Fcd/Ird. The last column (Diff) reports the significance levels of the t-test on the difference between the two sub-groups. Detailed definitions of all variables can be found in Appendix A. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$, respectively.

	Full Sample			Derivatives User			Nonuser			
Variable	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Diff
CAR_$[-5,5]$	1,369	0.47%	7.67%	994	0.62%	9.22%	375	-0.58%	7.05%	***
Completion	1,369	0.932	0.252	994	0.927	0.261	375	0.947	0.225	
Completion_time	1,276	48.8	85.6	921	51.2	71.7	355	42.6	114.1	*
△AROA_t,t+3	945	-0.07%	6.63%	695	0.17%	5.72%	250	-0.76%	8.65%	*
BHAR_3Y	1,040	-0.01%	2.36%	747	0.11%	2.19%	293	-0.32%	2.73%	***

Panel E. Summary statistics of control variables. This panel presents summary statistics for 1,369 cross-border M&A deals in our sample. The sample period is between 2000 and 2014. All acquirers are S&P 1500 companies and targets are from 58 different foreign countries or regions. Summary statistics are presented for the full sample, financial derivatives (Fcd/Ird) user sample, and nonuser sample. The last column reports the significance levels of the t-test on the difference between the two sub-groups. Detailed definitions of all variables can be found in Appendix A. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$, respectively.

	Full Sample			Derivatives User			Nonuser			
Variable	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**Diff**
Deal characteristics										
Cash	1,369	0.438	0.496	994	0.438	0.496	375	0.437	0.497	
Equity	1,369	0.064	0.245	994	0.048	0.214	375	0.107	0.309	***
Nonpublic	1,369	0.869	0.337	994	0.867	0.340	375	0.875	0.332	
Toehold	1,369	0.006	0.076	994	0.007	0.084	375	0.003	0.052	
Hostile	1,369	0.005	0.071	994	0.005	0.071	375	0.005	0.073	
Tender	1,369	0.061	0.240	994	0.065	0.247	375	0.051	0.220	
Related_industry	1,369	0.573	0.495	994	0.561	0.496	375	0.605	0.489	
Relative_size	1,368	0.071	0.151	993	0.066	0.143	375	0.084	0.168	*
Transaction_value	1,368	491.2	3,686	993	594.8	4,290.7	375	216.9	847.1	*
Acquirer characteristics										
Size	1,369	8.49	1.69	994	8.82	0.05	375	7.62	0.07	***
Tobin's Q	1,369	2.280	1.696	994	2.243	1.689	375	2.376	1.716	
Leverage	1,369	0.434	0.193	994	0.471	0.185	375	0.336	0.180	***
Cash/assets	1,368	0.168	0.164	993	0.148	0.146	375	0.222	0.193	***
Governance	1,321	1.888	1.269	973	1.859	1.292	348	1.968	1.199	
Runup	1,369	0.092	0.338	994	0.083	0.296	375	0.117	0.429	*
Sigma	1,369	0.020	0.009	994	0.018	0.009	375	0.024	0.011	***
ROA	1,369	0.153	0.077	994	0.155	0.071	375	0.147	0.092	*
Managerial_score	1,220	0.026	0.143	883	0.023	0.143	337	0.036	0.143	
Counts	1,369	23.20	78.55	994	22.29	71.72	375	25.62	94.37	

Table 2: Acquirer announcement returns estimated by the market model and financial hedging

This table presents the regression results of acquirer cumulative abnormal returns (CARs) on financial hedging variables. The OLS regressions with robust standard errors are based on a sample of 1,274 completed deals that are carried out by S&P 1500 firms between 2000 and 2014. The dependent variable is the acquirer CAR over the 11-day event window $(-5, +5)$ where 0 is the announcement day. The benchmark is estimated by the market model with the CRSP value-weighted index over the pre-announcement window $(-300, -91)$. Detailed definitions of all variables can be found in Appendix A. Year, Fama–French 10 industry, and S&P index fixed effects are controlled for all regressions. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$, respectively.

	1	2	3	4	5	6	7
Fcd	0.012**	0.011**	0.010*	0.010*			
	(0.016)	(0.032)	(0.055)	(0.056)			
Fcd/Ird					0.011*		
					(0.055)		
Hedging_scope						0.005*	
						(0.098)	
Nv_derivatives							0.015**
							(0.036)
Cash		-0.000	-0.001	-0.001	-0.001	-0.001	-0.001
		(0.984)	(0.844)	(0.850)	(0.815)	(0.825)	(0.847)
Equity		-0.033**	-0.031**	-0.031**	-0.031**	-0.031**	-0.031***
		(0.021)	(0.038)	(0.038)	(0.037)	(0.036)	(0.004)
Nonpublic		-0.014	-0.007	-0.007	-0.008	-0.007	-0.009
		(0.104)	(0.407)	(0.409)	(0.388)	(0.404)	(0.338)
Toehold		0.029	0.038*	0.038*	0.038*	0.037*	0.031
		(0.203)	(0.083)	(0.081)	(0.088)	(0.087)	(0.323)
Hostile		-0.013	-0.020	-0.019	-0.020	-0.020	-0.022
		(0.351)	(0.138)	(0.154)	(0.150)	(0.133)	(0.563)
Tender		-0.011	-0.015	-0.015	-0.015	-0.015	-0.014
		(0.341)	(0.225)	(0.225)	(0.205)	(0.213)	(0.285)
Related_industry		-0.002	-0.004	-0.004	-0.004	-0.004	-0.006
		(0.684)	(0.367)	(0.362)	(0.322)	(0.310)	(0.188)
Relative_size			0.042*	0.042*	0.041*	0.041*	0.027
			(0.063)	(0.062)	(0.064)	(0.062)	(0.114)
Size			-0.002	-0.002	-0.002	-0.003	-0.001
			(0.309)	(0.296)	(0.351)	(0.256)	(0.617)
Tobin's Q			-0.001	-0.001	-0.001	-0.001	-0.002
			(0.689)	(0.701)	(0.692)	(0.782)	(0.348)
Leverage			-0.005	-0.005	-0.006	-0.006	-0.009
			(0.698)	(0.677)	(0.651)	(0.657)	(0.542)
Cash/assets			-0.015	-0.015	-0.013	-0.013	-0.016
			(0.433)	(0.455)	(0.516)	(0.493)	(0.397)
Governance			-0.001	-0.001	-0.001	-0.001	-0.002
			(0.596)	(0.604)	(0.707)	(0.657)	(0.505)
Runup			-0.017*	-0.018*	-0.018*	-0.018*	-0.018**
			(0.067)	(0.065)	(0.063)	(0.060)	(0.016)
Sigma			-0.014	-0.008	0.051	0.031	0.128
			(0.981)	(0.990)	(0.930)	(0.958)	(0.758)
Foreign_debt				0.002	0.002	0.002	0.003
				(0.694)	(0.681)	(0.733)	(0.672)
Intercept	-0.007	0.013	0.025	0.026	0.021	0.028	0.015
	(0.543)	(0.415)	(0.375)	(0.370)	(0.471)	(0.340)	(0.625)
S&P index fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,274	1,274	1,228	1,228	1,228	1,228	1,075
Adj R-squared	0.044	0.056	0.055	0.065	0.065	0.064	0.072

Table 3: Acquirer CARs and financial hedging: treatment effect

This table presents the regression results of acquirer cumulative abnormal returns (CARs) on financial hedging variables, using an endogenous binary-treatment model estimated by a two-step consistent estimator. The first-step treatment equation is estimated by a probit regression, where the dependent variable is Fcd in model 1–2 and Fcd/Ird in model 3–4. In model 1 and 3, the instrument variable used in the treatment equation is Analyst_number. In model 2 and 4, the instrument variable used in the treatment equation is Foreign_sales/Sales. In the outcome equations, the dependent variable is acquirer CARs estimated by the market model. Detailed definitions of all variables can be found in Appendix A. Year, industry, and S&P index fixed effects are controlled for in all regressions. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$, respectively.

	Model 1		**Model 2**		**Model 3**		**Model 4**	
	Treatment	**Outcome**	**Treatment**	**Outcome**	**Treatment**	**Outcome**	**Treatment**	**Outcome**
Fcd		0.109 ***		0.034 *				
		(0.009)		(0.062)				
Fcd/Ird						0.104 ***		0.066 ***
						(0.001)		(0.003)
Cash		-0.002		-0.001		-0.003		-0.001
		(0.698)		(0.872)		(0.584)		(0.809)
Equity		-0.029***		-0.029 ***		-0.030 ***		-0.029 ***
		(0.005)		(0.005)		(0.003)		(0.005)
Nonpublic		-0.010		-0.005		-0.011		-0.006
		(0.263)		(0.551)		(0.242)		(0.510)
Toehold		0.051		0.056 *		0.054		0.057 *
		(0.138)		(0.063)		(0.111)		(0.063)
Hostile		-0.027		-0.024		-0.027		-0.022
		(0.488)		(0.527)		(0.482)		(0.556)
Tender		-0.009		-0.014		-0.010		-0.014
		(0.467)		(0.246)		(0.440)		(0.232)
Related_industry		-0.003		-0.004		-0.003		-0.004
		(0.527)		(0.308)		(0.449)		(0.307)
Relative_size		0.037 **		0.047 ***		0.036 **		0.046 ***
		(0.021)		(0.003)		(0.026)		(0.004)
Size	0.366 ***	-0.011 **	0.284 ***	-0.004	0.265***	-0.007**	0.197 ***	-0.004
	(0.000)	(0.014)	(0.000)	(0.167)	(0.000)	(0.036)	(0.002)	(0.158)
Tobin's Q	-0.094 **	0.002	-0.070 *	0.000	-0.081 **	0.001	-0.059	0.000
	(0.016)	(0.437)	(0.071)	(0.892)	(0.046)	(0.552)	(0.147)	(0.842)
Leverage	1.245 ***	-0.050 **	1.630 ***	-0.013 **	1.570***	-0.047**	1.896***	-0.027
	(0.000)	(0.037)	(0.000)	(0.406)	(0.000)	(0.022)	(0.000)	(0.124)
Cash/assets	0.175	-0.011	-0.097	-0.014	-0.304	0.008	-0.440	-0.003
	(0.622)	(0.623)	(0.787)	(0.449)	(0.414)	(0.708)	(0.242)	(0.879)

Continued on next page

Table 3 – continued from previous page

	Model 1		Model 2		Model 3		Model 4	
	Treatment	**Outcome**	**Treatment**	**Outcome**	**Treatment**	**Outcome**	**Treatment**	**Outcome**
Governance	-0.025	-0.002	0.036	-0.001	-0.113 **	0.000	-0.085 *	0.001
	(0.565)	(0.464)	(0.410)	(0.719)	(0.017)	(0.855)	(0.063)	(0.662)
Runup	-0.227	-0.008	-0.066	-0.018 **	-0.191	-0.009	-0.049	-0.018 **
	(0.129)	(0.415)	(0.656)	(0.015)	(0.219)	(0.284)	(0.746)	(0.021)
Sigma	7.637	-0.275	4.782	-0.216	-9.041	0.237	-11.013	0.069
	(0.325)	(0.562)	(0.531)	(0.589)	(0.257)	(0.614)	(0.159)	(0.868)
Foreign_debt	0.137	-0.002	-0.017	0.001	0.064	0.001	0.046	0.000
	(0.255)	(0.767)	(0.886)	(0.907)	(0.632)	(0.884)	(0.725)	(0.932)
Analyst_number	-0.021 **				-0.015 *			
	(0.029)				(0.095)			
Foreign_sales/Sales			1.672 ***				1.068 ***	
			(0.000)				(0.000)	
Intercept	-3.650***	0.079**	-3.780***	0.033	-2.109 ***	0.020	-2.149 ***	0.009
	(0.000)	(0.037)	(0.000)	(0.276)	(0.001)	(0.560)	(0.000)	(0.771)
S&P/Industry/Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,081	1,081	1,184	1,184	1,081	1,081	1,184	1,184
$Prob > chi2$	0.000		0.000		0.000		0.000	

Table 4: Deal completion probabilities and financial hedging

This table presents the regression results of cross-border M&A deal completion probabilities on financial hedging variables. Probit (columns 1–4) and logit (column 5) regressions are estimated based on a sample of 1,369 completed and withdrawn deals that are carried out by S&P 1500 firms between 2000 and 2014. The dependent variable is a binary variable that takes the value of 1 if the deal was completed and 0 otherwise. Detailed definitions of all variables can be found in Appendix A. Year, Fama–French 10 industry, and S&P index fixed effects are controlled for all regressions. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$, respectively.

	1	**2**	**3**	**4**	**5**
Fcd	-0.031				
	(0.804)				
Fcd/Ird		-0.053			
		(0.694)			
Fcd_target			0.292**	0.322**	0.652**
			(0.017)	(0.018)	(0.018)
Cash				0.149	0.283
				(0.259)	(0.282)
Equity				0.221	0.415
				(0.423)	(0.417)
Nonpublic				0.524***	0.891**
				(0.010)	(0.019)
Toehold				-0.001	-0.206
				(0.999)	(0.864)
Hostile				-1.456**	-3.052**
				(0.024)	(0.012)
Tender				1.112***	2.464***
				(0.003)	(0.006)
Related_industry				-0.205	-0.393
				(0.115)	(0.137)
Relative_size				-0.718*	-1.484**
				(0.057)	(0.030)
Size				-0.044	-0.102
				(0.546)	(0.481)
Tobin's Q				-0.037	-0.068
				(0.454)	(0.490)
Leverage				-0.122	-0.123
				(0.756)	(0.872)
Cash/assets				0.112	0.137
				(0.832)	(0.895)
Governance				0.132**	0.247**
				(0.037)	(0.048)
Runup				0.228	0.470
				(0.249)	(0.228)
Sigma				-31.541***	-61.840***
				(0.004)	(0.004)
Foreign_debt				-0.304**	-0.651**
				(0.039)	(0.024)
Intercept	1.548***	1.563***	1.413***	2.099**	3.916**
	(0.000)	(0.000)	(0.000)	(0.012)	(0.017)
S&P index fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	1,369	1,369	1,219	1,171	1,171
Pseudo R-squared	0.042	0.042	0.049	0.128	0.129

Table 5: Deal completion time and acquirer financial hedging

This table presents the tobit regression results of deal completion time on acquirer financial hedging variables. The sample includes 1,282 successful cross-border mergers and acquisitions carried out by S&P 1500 firms between 2000 and 2014. The dependent variable, Completion_time, is the number of days between the deal announcement date and the acquisition effective date. Detailed definitions of all variables can be found in Appendix A. Year, Fama–French 10 industry, and S&P index fixed effects are controlled for all regressions. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$, respectively.

	1	**2**	**3**	**4**
Fcd	32.37***			
	(0.000)			
Fcd_target		28.70***		
		(0.000)		
Fcd/Ird			22.84***	
			(0.007)	
Hedging_scope				20.28***
				(0.000)
Cash	7.46	4.99	6.26	7.56
	(0.288)	(0.524)	(0.373)	(0.282)
Toehold	33.55	37.37	32.98	25.60
	(0.520)	(0.434)	(0.532)	(0.633)
Hostile	43.80	36.25	38.49	38.74
	(0.294)	(0.403)	(0.408)	(0.371)
Tender	47.25***	45.41***	47.08***	46.59***
	(0.000)	(0.000)	(0.000)	(0.000)
Related_industry	16.56**	18.64**	15.08**	15.15**
	(0.019)	(0.017)	(0.033)	(0.032)
Relative_size	109.33***	106.07***	105.32***	108.63***
	(0.000)	(0.000)	(0.000)	(0.000)
Runup	1.46	-0.33	0.59	0.29
	(0.894)	(0.978)	(0.957)	(0.979)
Sigma	-1940.7***	-1588.8**	-1944.0***	-1685.3***
	(0.001)	(0.011)	(0.001)	(0.004)
Foreign_debt	20.63**	24.45**	20.97**	16.78*
	(0.020)	(0.011)	(0.019)	(0.058)
Intercept	19.97	14.44	19.44	17.61
	(0.456)	(0.608)	(0.482)	(0.520)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	708	630	708	708
Pseudo R-squared	0.018	0.017	0.016	0.018

Table 6: Long-run performance and financial hedging

This table presents the regression results of acquirer long-run performance measures on financial hedging variables. The OLS regressions with robust standard errors are based on a sample of 1,276 successful cross-border M&As made by S&P 1500 firms between 2000 and 2014. In columns 1–3 the dependent variable is the acquirer operating performance proxy variable △AROA. In columns 4–6, the dependent variable is the acquirer buy-and-hold abnormal stock return (BHAR) over three years after the announcement date. Detailed definitions of all variables can be found in Appendix A. Year, Fama–French 10 industry, and S&P index fixed effects are controlled for all regressions. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by ∗ ∗ ∗, ∗∗, and ∗, respectively.

	Operating Performance			**Stock Performance**		
	1	**2**	**3**	**4**	**5**	**6**
Fcd	0.007*			0.004**		
	(0.086)			(0.041)		
Fcd/Ird		0.007*			0.007***	
		(0.094)			(0.001)	
Hedging_scope			0.001*			0.003**
			(0.089)			(0.013)
Cash	0.002	0.002	0.002	-0.003**	-0.003**	-0.003**
	(0.691)	(0.672)	(0.651)	(0.044)	(0.044)	(0.049)
Equity	-0.022*	-0.022*	-0.021*	-0.007*	-0.007*	-0.007*
	(0.088)	(0.086)	(0.097)	(0.069)	(0.086)	(0.072)
Nonpublic	0.017*	0.017*	0.017*	-0.003	-0.004	-0.003
	(0.092)	(0.091)	(0.096)	(0.174)	(0.129)	(0.171)
Toehold	0.020	0.020	0.020	-0.002	-0.003	-0.003
	(0.119)	(0.112)	(0.118)	(0.784)	(0.724)	(0.719)
Hostile	0.009	0.010	0.010	-0.008	-0.008	-0.008
	(0.753)	(0.747)	(0.732)	(0.582)	(0.571)	(0.562)
Tender	0.011	0.011	0.011	-0.002	-0.002	-0.002
	(0.359)	(0.341)	(0.353)	(0.540)	(0.450)	(0.500)
Related_industry	0.004	0.004	0.004	0.004**	0.004**	0.004**
	(0.315)	(0.292)	(0.293)	(0.017)	(0.019)	(0.022)
Relative_size	-0.016	-0.015	-0.016	-0.005	-0.005	-0.005
	(0.239)	(0.263)	(0.244)	(0.418)	(0.357)	(0.392)
Size	0.006**	0.006**	0.006**	-0.001	-0.001	-0.001
	(0.019)	(0.022)	(0.032)	(0.420)	(0.369)	(0.232)
Tobin's Q	0.007***	0.007***	0.007***	0.000	0.000	0.000
	(0.007)	(0.007)	(0.007)	(0.765)	(0.708)	(0.542)
Leverage	0.015	0.014	0.012	0.004	0.003	0.003
	(0.436)	(0.459)	(0.516)	(0.451)	(0.561)	(0.555)
Cash/assets	-0.015	-0.016	-0.016	-0.004	-0.003	-0.003
	(0.600)	(0.553)	(0.574)	(0.584)	(0.719)	(0.679)
Governance	0.000	0.000	0.000	0.000	0.000	0.000
	(0.910)	(0.996)	(0.965)	(0.677)	(0.548)	(0.607)
Foreign_debt	-0.005	-0.005	-0.004	0.002	0.002	0.002
	(0.320)	(0.323)	(0.338)	(0.199)	(0.212)	(0.266)
ROA	-0.208***	-0.207***	-0.207***	0.000	-0.000	0.000
	(0.006)	(0.007)	(0.007)	(0.973)	(0.967)	(0.964)
Intercept	-0.085***	-0.082***	-0.082***	0.002	0.001	0.004
	(0.008)	(0.009)	(0.009)	(0.814)	(0.922)	(0.693)
S&P index fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	913	913	913	997	997	997
Adj R-squared	0.129	0.129	0.127	0.056	0.064	0.058

Table 7: Acquirer announcement returns and financial hedging: alternative explanations

This table presents the binary-treatment model regression results of acquirer cumulative abnormal returns (CARs) on financial hedging variables, with control variables for alternative explanations. We only report the results of the second-step outcome equations. The first-step treatment regression results are similar to those reported in Table 3. The first-step treatment equation is estimated by a probit regression, where the dependent variable is Fcd (columns 1–2) and Fcd/Ird (columns 3–4). In columns 1 and 3, the instrument variable used in the treatment equation is Analyst_number. In columns 2 and 4, the instrument variable used in the treatment equation is Foreign_sales/Sales. In the outcome equations, the dependent variable is acquirer CARs estimated by the market model. All the control variables that are not listed separately in the outcome equations are the same as those in Table 3. Year, industry, and S&P index fixed effects are controlled for all regressions. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$, respectively.

Panel A. Managerial ability. We control for managerial ability variable, Managerial_score (Demerjian et al., 2012), in the outcome equations. This index is obtained from Peter Demerjian's website, which is then matched to our cross-border M&A sample over the period 2000 to 2011.

	1	**2**	**3**	**4**
Fcd	0.137 ***	0.038 *		
	(0.004)	(0.053)		
Fcd/Ird			0.122 ***	0.074 ***
			(0.000)	(0.002)
Managerial_score	-0.042 **	-0.042 **	-0.047 **	-0.048 ***
	(0.026)	(0.018)	(0.012)	(0.006)
Control variables	Yes	Yes	Yes	Yes
S&P/Industry/Year fixed effects	Yes	Yes	Yes	Yes
Observations	949	1,051	949	1,051
$Prob > chi2$	0.000	0.000	0.000	0.000

Panel B. Foreign operational exposures. We control for the number of mentions of target nations in acquirers' 10-K reports, Counts, in the outcome equations.

	1	**2**	**3**	**4**
Fcd	0.106 **	0.042 *		
	(0.014)	(0.065)		
Fcd/Ird			0.090 ***	0.066 **
			(0.008)	(0.014)
ln(Counts)	0.000	0.000	0.000	0.000
	(0.826)	(0.971)	(0.890)	(0.929)
Control variables	Yes	Yes	Yes	Yes
S&P/Industry/Year fixed effects	Yes	Yes	Yes	Yes
Observations	1,072	1,174	1,072	1,174
$Prob > chi2$	0.000	0.000	0.000	0.000

Panel C. Serial acquirer. We control for serial acquirers in the outcome equations. The variable Serial_acquirer is equal to the number of deals carried out by the same acquirer before the deal announcement in our sample.

	1	**2**	**3**	**4**
Fcd	0.110 ***	0.034 *		
	(0.009)	(0.062)		
Fcd/Ird			0.105 ***	0.066 ***
			(0.001)	(0.003)
Serial_acquirer	-0.001	0.000	-0.001	0.000
	(0.594)	(0.919)	(0.535)	(0.787)
Control variables	Yes	Yes	Yes	Yes
S&P/Industry/Year fixed effects	Yes	Yes	Yes	Yes
Observations	1,081	1,184	1,081	1,184
$Prob > chi2$	0.000	0.000	0.000	0.000

Panel D. Commodity. We control for commodity derivatives usage in the outcome equations. The variable Commodity equals to 1 if an acquirer use commodity derivatives in the fiscal year prior to the deal announcement, and 0 otherwise.

	1	**2**	**3**	**4**
Fcd	0.102 **	0.031 *		
	(0.015)	(0.085)		
Fcd/Ird			0.098 ***	0.061 ***
			(0.003)	(0.008)
Commodity	-0.008	-0.011 *	-0.006	-0.009
	(0.267)	(0.083)	(0.366)	(0.180)
Control variables	Yes	Yes	Yes	Yes
S&P/Industry/Year fixed effects	Yes	Yes	Yes	Yes
Observations	1,081	1,184	1,081	1,184
$Prob > chi2$	0.000	0.000	0.000	0.000

Panel E. All four variables. We add all four control variables from Panel A to Panel D together in the outcome equations.

	1	**2**	**3**	**4**
Fcd	0.144 ***	0.045 *		
	(0.005)	(0.078)		
Fcd/Ird			0.125 ***	0.078 ***
			(0.001)	(0.010)
Managerial_score	-0.052 **	-0.055 ***	-0.057 ***	-0.061 ***
	(0.015)	(0.007)	(0.008)	(0.003)
ln(Counts)	0.001	0.000	0.001	0.000
	(0.566)	(0.883)	(0.606)	(0.934)
Serial_acquirer	-0.001	0.000	-0.001	0.000
	(0.626)	(0.905)	(0.639)	(0.863)
Commodity	-0.004	-0.010	-0.001	-0.007
	(0.675)	(0.199)	(0.920)	(0.419)
Control variables	Yes	Yes	Yes	Yes
S&P/Industry/Year fixed effects	Yes	Yes	Yes	Yes
Observations	718	795	718	795
$Prob > chi2$	0.000	0.000	0.000	0.000

Table 8: Acquirer announcement returns and financial hedging: triple fixed effects model

This table presents the regression results of acquirer cumulative abnormal returns (CARs) on financial hedging variables with triple fixed effect estimation. The regressions are based on a sample of 1,274 completed deals carried out by S&P 1500 firms between 2000 and 2014. Following Gormley and Matsa (2014), we use the triple interaction fixed effects model (Year × Acquirer Fama-French 10 industry × Target Fama-French 10 industry) to control for unobserved acquirer and target characteristics. The dependent variable is the acquirer CAR over the 11-day event window $(-5, +5)$ where 0 is the announcement day. The benchmark is estimated by the market model with the CRSP value-weighted index over the pre-announcement window $(-300, -91)$. The control variables are the same as those in Table 2. Detailed definitions of all variables can be found in Appendix A. P-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$, respectively.

	1	2	3	4	5	6	7
Fcd	0.012**	0.010**	0.010**	0.010**			
	(0.015)	(0.036)	(0.044)	(0.044)			
Fcd/Ird					0.011**		
					(0.043)		
Hedging_scope						0.005	
						(0.150)	
Nv_derivatives							0.015**
							(0.039)
Control variables	No	Yes	Yes	Yes	Yes	Yes	Yes
Triple fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,262	1,262	1,215	1,215	1,215	1,215	1,061
Adj R-squared	0.065	0.076	0.083	0.083	0.083	0.082	0.090

Table 9: Propensity score matched acquisition outcomes

This table reports the cross-border M&A deal outcomes adjusted using propensity scores that are estimated by logit regressions of the FX hedging likelihood on firm characteristics. The sample includes 865 deals announced by FX derivatives users and 504 deals announced by non-FX derivatives users. The independent variables in the logit regressions are Relative_size, Leverage, Cash/assets, Governance, and Tobin's Q. The differences in deal outcomes between deals announced by FX derivatives users (treated sample) and propensity score matched deals announced by non-FX derivatives users (control sample) are reported. Detailed definitions of all variables can be found in Appendix A. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$, respectively.

	10 Nearest	30 Nearest	50 Nearest	Gaussian Kernel
CAR_$[-5, 5]$	0.009 *	0.008 *	0.008 **	0.010
	(0.076)	(0.078)	(0.044)	(0.150)
Completion	0.039 **	0.042 **	0.042 **	0.052 *
	(0.026)	(0.018)	(0.017)	(0.063)
Completion_time	11.4	12.0 *	7.9	20.1 ***
	(0.133)	(0.088)	(0.408)	(0.000)
△ROA_t,t+3	0.008 **	0.010 ***	0.012 ***	0.011 ***
	(0.045)	(0.001)	(0.002)	(0.065)

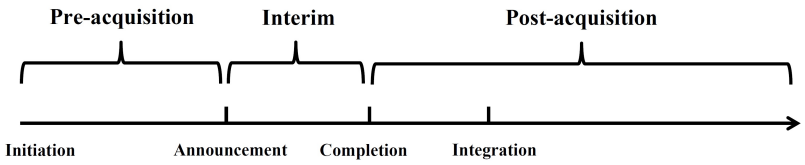

Figure 1: Financial risks along a cross-border M&A timeline.

This figure presents a typical cross-border M&A timeline and the associated financial risks at different phases of the deal. We define the pre-acquisition period to be between the deal initiation date and the announcement date. During this period, acquirers and targets privately negotiate with each other. Next we define the interim period to be between the announcement date and the deal completion date. Finally, we define the post-acquisition period as the period after the deal completion date, which can be further divided into the integration stage and the post-integration stage.

- Pre-acquisition period: Evaluating target's financial risk
- Interim Period: Transaction risk
  - Transaction risk refers to the uncertainty that the U.S. dollar value of a target's price and the external financing costs may change with the foreign exchange rate and the interest rate between the deal initiation and the deal completion.
- Post-acquisition period: Integration risk, Balance-sheet risk, Cash flow risk
  - Integration risk refers to the uncertainty for an acquirer when designing the new financial risk management programs of the combined entity during the integration period.
  - Balance-sheet risk refers to the uncertainty about the U.S. dollar value of acquired assets or liabilities, due to the movement of foreign exchange rates.
  - Cash flow risk refers to the uncertainty about the U.S. dollar value of future operating cash flows, due to the movement of foreign exchange rates.

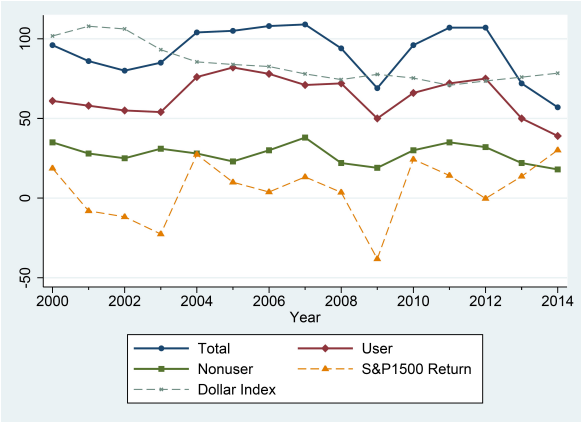

Figure 2: Distribution of cross-border M&As by year.

This figure presents the annual numbers of cross-border M&As deals made by S&P 1500 companies between 2000 and 2014. We also plot the annual numbers of cross-border M&As made by derivatives users and nonusers using two solid lines. The two dotted lines represent the S&P 1500 index annual returns (multiply by 100) and the annual trade-weighted U.S. dollar index levels.